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NEW YORK • LONDON

WORLD PETROLEUM

How Will U.S.S.R. Complete Her Refinery Program? • Producing Oil in England • Cumarebo Passes Peak of Production • Ohio Motorists Welcome Glass Packaged Lubricants • T.V.P. Process at Wood River • Two Miles Below Earth's Surface

JULY • 1934

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"A Decade of Progress"

PRINTING COMPANY ON ITS 10TH ANNIVER

JULY
1934

WORLD PETROLEUM

VOLUME V — **Editor, E. W. Mayo** — NUMBER 7

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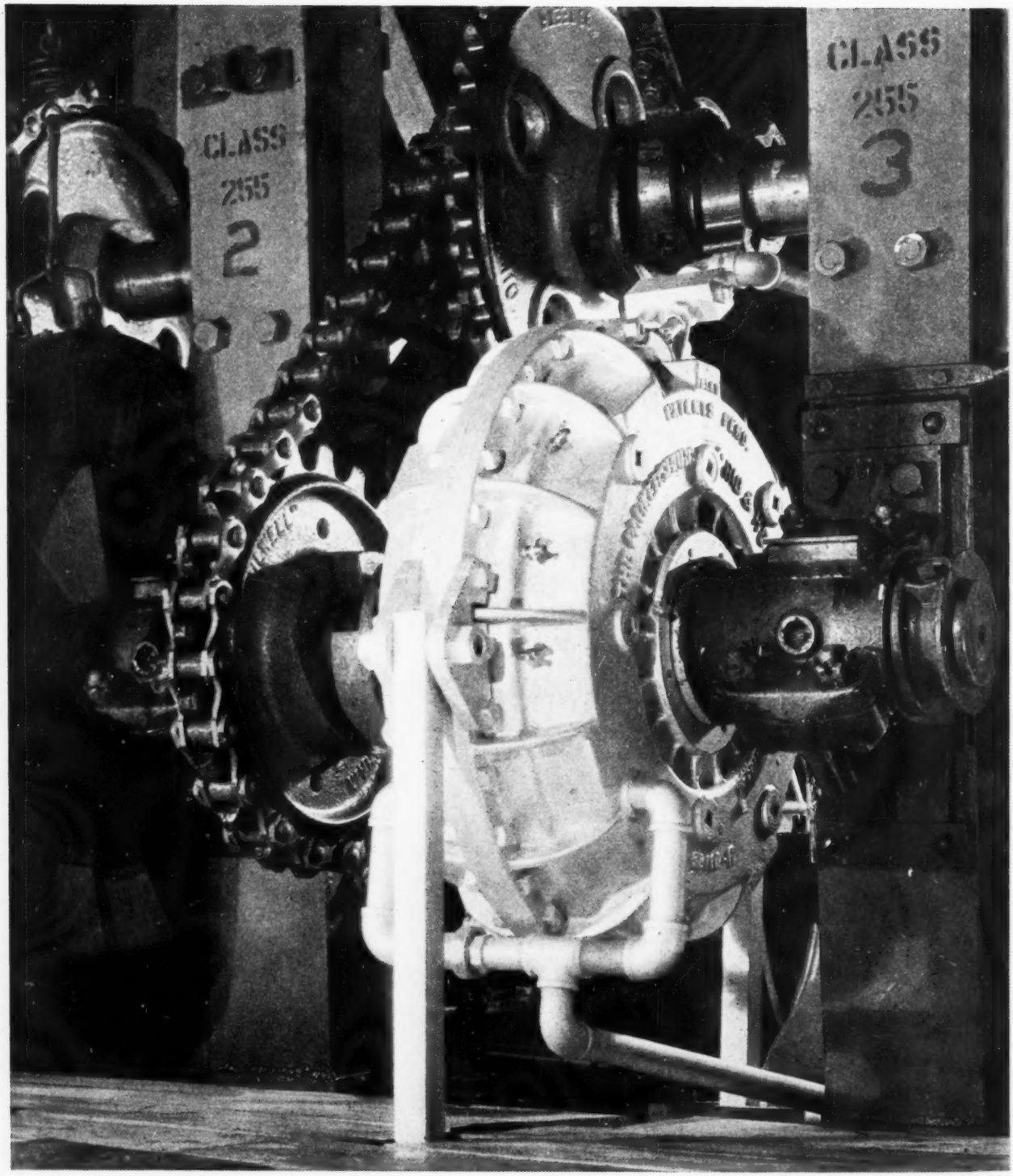

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PETROLEUM

Growth in Consumption

MOST ENCOURAGING of the developments in the petroleum situation during the first half of 1934 has been the increased consumption of motor fuel. Special significance attaches to the fact that this improvement in demand has not been confined to any one region but has taken place in practically all countries that rank as important markets for petroleum products. No better evidence could be produced to show that the world is gradually working its way out from the conditions that have stifled industry and paralyzed international trade during the past four years. Petroleum enters in so many ways into the activities to which civilized man devotes his energies that it is today one of the most reliable of business barometers.

In the United States the statistics published by the Bureau of Mines show that motor fuel demand during the first four months of the year was roundly 5,000,000 tons higher than in the corresponding period of 1933, an increase of 8.21 percent. Consumption is still below the level of 1931 but the gain in comparison with the past two years is most encouraging for the future.

Figures for the past two months have not been published but they are not expected to show as high a rate of gain as those for the earlier part of the year. Drouth in the West, the termination of a large part of the government's relief work and the general slowing down of business are factors affecting the situation, but the upward trend is so well defined that any falling off is likely to be temporary.

In Europe and in practically all parts of the world outside the United States there was no such decline in consumption as took place in the latter country in 1932 and 1933, probably because they felt the depression less severely. In all these countries, nevertheless, a notable expansion in motor fuel demand has been observable during the early months of the year, indicating a distinct revival in industrial activity that is confirmed by other trade reports.

In France the rise in demand for petroleum products during the first four months of the current year has amounted to over 12 percent as compared with the same period in the year preceding. In the United Kingdom there has been an increase of about 10 percent. In Germany it has been still higher while in South Africa it has amounted to 20 percent. Australia shows a gain of over 10 percent and in fact in every country from which reliable reports are obtainable the return toward normal industrial activity is signalized by increasing demand for petroleum fuels. This of course is the best possible remedy for oversupply.

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Soviet Refining

IN ORDER to form a sound appraisal of the possibilities of oil development in the Soviet Union in the next few years it is necessary to consider not only the plans formulated for an approximate doubling of output but also the prospects of providing the physical equipment for the production, refining and transportation of a greatly enlarged supply. It is clear enough that the progressive industrialization of the country will call for more and more motor fuel to meet domestic requirements while the maintenance of exports at or above the levels of recent years is considered important as a means of establishing the foreign credits necessary for the purchase of needed products of various kinds.

Examination of the existing situation indicates that the limiting factor in the realization of the plan for a total output of 40,000,000 tons of petroleum products three years hence is the extent of refining facilities that can be provided. At the present time, while Grozni possesses more refining capacity than it can use the refining capacity at Baku and Batum, serving the principal Soviet fields, is below actual production in these areas. This disparity is likely to become more pronounced as time goes on. Even though the drilling campaign for the current five-year period fails to reach the announced requirement it is altogether probable that the refining program may fall still further into arrears.

As pointed out in the discussion of the Soviet refining situation which appears elsewhere in this issue some 20,000,000 tons of additional refining capacity will have to be provided. As it requires about three years to complete a single refining plant, using Soviet manufacturing facilities, it is easy to realize that the limited foundry and machine plant available within the Soviet Union makes the construction of more than a hundred refining units within this length of time a practical impossibility if domestic engineering and manufacturing facilities are to be the sole reliance for achieving this result. In certain of the Soviet fields, moreover, the presence of a large proportion of sulphur in the oil

calls for treatment by processes which Soviet engineers heretofore have had scant success in applying.

The alternative course is the purchase from other countries of a large part of the refinery equipment required for carrying out the current program of expansion. This procedure has been advocated in some of the proposals for development advanced by Soviet engineers.

Since the expenditure involved in carrying out a project of this extent amounts to upward of 200,000,000 gold rubles, including about 70,000,000 rubles for equipment, a financial problem of important proportions is presented.

Ultimate solution of this problem probably will be reached by a curtailment of existing plans and the adoption of a modified program under which a certain amount of equipment will be purchased from American and European manufacturers while Soviet plants will be called upon to supply the remainder. Such new refineries as may be erected under this plan probably could do little more than take care of the increase in domestic demand if this expands at the rate anticipated. Though the figures set forth in the official program run to impressive totals there would seem to be no reason to anticipate any serious enlargement in the existing volume of Soviet exports of petroleum products for the next several years.

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Hot Oil's Victory

THAT numerically small but apparently powerful segment of the American oil industry described by Secretary Ickes as "the hot oil gentlemen" won a sweeping victory in the Congress of the United States when the Committee on Interstate and Foreign Commerce, under the leadership if not under the domination of its chairman, Representative Rayburn of Texas, slaughtered the Ickes oil control bill almost on the eve of adjournment.

Politics—Texas state politics—apparently provided the reason for the untoward fate of the bill. Texans hold positions of strategic power in both the Senate and the House of Representatives but no one of them was willing to introduce the bill. The report current at the Capitol was that some Texas members who are coming up for re-election felt that a vote on the bill, either for or against it, would raise an issue that might be used against them.

The strong antipathy of Texas Congressman Rayburn to anything that would curtail the opportunities of Texans to produce oil regardless of the national welfare or the best interests of their fellow citizens was made evident early in the session and throughout the public hearings on the bill. The committee remained adamantine against the appeals of the President and against the demands of the great majority of the independent producers of Texas for protection against the menace of "hot oil." It voted, twelve to five, against reporting the bill to the House. Had it been reported favorably it undoubtedly would have been passed, but with adjournment in sight the committee's action effectively balked any further effort to provide practical regulation.

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Another Oil Investigation

CALLING into play the good old Congressional device of designating a committee to "study" any question on which influential members find it personally inconvenient to go on record the House voted almost with unanimity for an investigation of the oil situation by a sub-committee of the House Interstate and Foreign Commerce Committee of which Representative Cole of Maryland is chairman. What this committee can do except to thresh over old straw is problematical in view of the mountain of statistical and other information pertaining to all phases of the oil industry that has been assembled, discussed, charted and put into reports in Washington over and over again during the past few years. No doubt the committee, however, will traverse this well-worn ground again. It is directed to determine whether there is an excessive supply of petroleum and its products, whether this excess reacts injuriously upon the petroleum industry itself, whether restrictions upon the production of oil and its movement in commerce when produced in excess are advisable, and "all other questions" relating to commerce in petroleum and its products.

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Efforts for Stabilization

MEANWHILE Oil Administrator Ickes has announced that he will carry on as best he can under existing conditions. While admitting that the action of the House Committee on Interstate Commerce created a dangerous situation he stated that existing regulations would be enforced so far as the courts would permit. The Planning and Coordination Committee too is endeavoring to meet the situation in the refining industry by submitting to refiners in East Texas a stabilization plan which includes an agreement to purchase distress gasoline on condition that the local refiners pledge themselves not to handle "hot oil." This proposal has received the approval of a majority of the East Texas refiners. In California the new agreement among the refiners which has been drawn up to replace the ill-fated cartel projected earlier in the year has been sanctioned by the Department of Justice as well as the Oil Administration and holds possibilities at least of strengthening the marketing situation on the Pacific Coast.

These efforts to hold the ground that has been gained and to prevent the crude and refined markets from falling into the chaotic condition that prevailed during the early part of 1933 do not mean an abandonment of the effort to get Congress to enact a sound measure for the regulation of commerce in petroleum.

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Prices Weakened

WITHOUT deprecating the value of the efforts that are being put forth to prevent demoralization of the market it is obvious, as we have pointed out many times, that anything approaching permanent stability is impossible without some effective means of preventing excessive and illegal production. So long as "hot oil" is produced it is bound to find an outlet somewhere. The very fact that it must be produced and marketed in evasion of established laws and regulations means that it will be sold at cut prices and that wherever it appears in considerable quantities price demoralization must result.

Since September last when crude oil was lifted to a dollar-a-barrel basis the price structure in the United States has not been a logical one. The wholesale and retail prices of motor fuel at most times and in most places have not reflected the basic price of crude. Refining and marketing operations in a great part of the country have been conducted at a loss. Within the past two months there has been an improvement in this respect, due to the voluntary action of refiners themselves under the leadership of the Planning and Coordination Committee.

Signs of weakness in the present price structure have appeared with ominous frequency. If the rise in contraband output which took place in Texas and to a less degree elsewhere immediately the fear of regulatory legislation was lifted should continue unchecked it will be difficult if not impossible to prevent a collapse in prices. If such a retrogression does occur oil producers will have no difficulty in fixing responsibility upon those Texas politicians who were instrumental in scuttling the Ickes bill.

Can U.S.S.R. Refine Her Crude Production?

Soviet Domestic Consumption and Consequently Industrial and Agricultural Progress; Oil Exports with Resulting Foreign Credits Both Depend on Completion of Refinery Plans by 1937

"OIL IS AN important factor in our national economy. Oil is important not only as fuel for our industries: What would happen to all our tractors, to our aviation, to our motor transportation and agriculture without oil and we have to admit that our oil industry has nothing to boast of." (J. Stalin: Speech at the XVII Conference of the Communist Party.) The quantity of oil products available for domestic consumption and export depends to a much larger extent on the refining capacity available than on the production of crude in the Soviet Union. Insufficient capacity is presently available: How will it be furnished by 1937? Three plans have been suggested and are described herewith.

IT IS proposed that forty-six pipe stills and 93 cracking units shall be completed and put into operation during the period of the Second Five Year Plan. This proposal is dictated by the ambitious plans set up for the industrialization of the country and the mechanization of agriculture as well as by the growing demand for oil products for transportation and public use.

Equipment Required for Four Projected Refineries to be Completed by 1937

	Gorki	Voronesh	Stalingrad	Ufa	Total
Metal for Equipment, (tons)	24,000	14,000	11,000	5,000	65,000
Metal for storage, (tons)	63,000	16,000	14,000	7,000	100,000
Pumps & Compressors, (units)	600	600	400	150	1,950
Pipe for refineries, (meters)	70,000	60,000	50,000	40,000	220,000
Pipe for Pipe lines, (meters)	95,000	95,000	55,000	11,000	166,000
Water mains (meters)	6,500	6,500	4,000	2,500	19,500
Towers (meters)	50,000	31,000	23,000	12,000	116,000
Motorcars & Tractors	80	64	48	28	222
Boilers	8	5	5	5	23

It is expected that total demand will be doubled and the requirements for motor fuel will grow from 2,800,000 tons in 1933 to over 10,000,000 tons in 1937. The policy for refinery construction will be based upon these requirements.

U.S.S.R. Refinery Construction 1929–1937
(Capacity in Tons)

1929	5,880,000
1930	3,980,000
1931	3,050,000
1932	1,100,000
1933	.....
1934	450,000
1935	500,000
1936–37	15,000,000

Over 1,000,000,000 Rbl. were allotted by the Soviet government for refinery construction during the period of the Second Five Year Plan ending in 1937 and all Soviet domestic industries and machine shops were to be instrumental in the reconstruction of the oil industry.

A considerable spread between Soviet crude production and refining capacity was noticeable at the end of 1933, particularly at Baku where the refining capacity of Baku and Batum did not exceed 13,500,000 tons per annum, while crude production amounted to about 15,000,000 tons. No change in refining capacity has taken place during the first five months of 1934, but crude production has increased considerably over the corresponding period of last year. Baku will probably produce 18,000,000 tons of a 22,000,000 ton quota in 1934 thus increasing the existing spread between crude production and refining capacity. At present surplus Baku crude is shipped to Grozni for processing, thus keeping refineries at Grozni and Tuapse running to capacity, but this is a temporary measure which will be discontinued as soon as the Molgabek field of Grozni begins capacity production from its 100 wells now drilling. Crude production in 1937 is planned at 47,000,000 tons and the total capacity of all Soviet refineries as of today does not exceed 27,000,000 tons:

Baku and Batum, 13,500,000 tons; Grozni-Tuapse 12,500,000; all other plants 1,000,000 tons.

Thus the Soviet oil industry will have to increase present run to still capacity by 20,000,000 tons in a period of about three years (1934–1937), or exactly the time which it takes at present to design and construct a domestic Russian refinery.

The reconstruction of the Soviet oil industry was begun in 1928. Up to 1932 (6 years) about 8,000,000 tons of shell stills were reconstructed and about 17,000,000 tons of new refining capacity was erected of which not less than 11,000,000 tons capacity was imported and the balance designed by domestic means.

The downward trend of refinery building in Russia dates from 1932 when orders were given to stop all imports of equipment for the oil industry and to foster domestic design and construction. The technique of building refineries of simple design has been mastered but it takes three years to complete a unit.

Outside of the construction started at Khabarovsk, Saratoff and Krasnovodsk several other sites were surveyed at Orsk and Melnikovo, Baku and Grozni. Plans were drawn up for refineries at Gorki, Stalingrad and Ufa and a large refinery is planned at Voronesh which is an important and strategic point in the black soil district. All these refineries, including the pipelines to serve them are scheduled to be completed by 1937. The capacities of the four latter are to be: Gorki 5,000,000 tons, Voronesh 3,000,000 tons, Stalingrad 2,000,000 tons and Ufa 1,000,000 tons.

Glavmashprom which is the combine of Soviet machine shops reports the following position of the shops:

Taganrog Boiler Works have an order for six boilers in connection with cracking units for Grozni and will be taxed to capacity for some time to come; Podolski Works have a capacity of about 15,000 tons, but the orders placed for Saratoff, Orsk and Neftgas will probably keep the shops busy over a period of about a year. Arrangements could be made for assistance from other plants under the jurisdiction of Glavmashprom by which about 25,000 tons of building capacity would be available. This would fill their capacity over a period of one and one-half years and the four refining units of Gorki Voronesh (or Yaroslavel), Ufa and Stalingrad for a total capacity of 10,000,000 tons require at least 65,000 tons of capacity for the building of equipment. No other machine shops are in a position to build equipment for immediate delivery.

In view of this situation three plans have been suggested by Soviet engineers L. Nersessoff and A. Akerman and by Neftproject (Planning Institute of the Oil Industry) for the construction of these projected refineries.

(Continued on page 242)

Great Britain as an Oil Producing Country

Hardstoft Well Completed in May 1919 Still Producing at the Rate of 100 Tons per Year. Results of Oil Exploration in Great Britain.

By Lieut. Col. the Hon. Ben Bathurst

THE recent introduction by the British Government of the Petroleum (Production) Bill having aroused considerable interest in the public mind a brief account of the events leading up to the present position may not be out of place.

The papers of April 10th of this year printed the written reply by the Secretary of Mines to a question by the Marquess of Hartington in the House of Commons. This was to the effect that during the last ten years ten formal applications had been made to the Petroleum Department for Licenses to bore for petroleum. Of these two were granted, two had been refused, and one was withdrawn. As to the others the formalities had not been completed pending the introduction of the Bill now before Parliament. Of the three licenses now in force the one of longest standing granted in 1923 to the Duke of Devonshire, covers Hardstoft in Derbyshire. The other two dated 1930 and 1931 are for two places in Sussex, one near Heathfield, the other near Three Bridges.

By way of apology it may be said that the following observations are made by one who was directly interested and closely connected with what may be called the first scientific search for oil in the United Kingdom.

Before the War, Lord Cowdray's firm, S. Pearson & Son Ltd. had a special Department, called the Foreign Oil Department, for the consideration of propositions from every part of the globe outside Mexico, in which I held a subordinate position. This most interesting work brought one into close association with the geologists who had to examine each case from their point of view and led to most informing conversations.

During the early days of the War, in course of conversation with Lord Cowdray I happened to say that I should not be surprised if some day oil were discovered in England, on which he asked my reason for saying this. I replied that it was based on what had been said by one of the staff, and we parted. On calling on the chief geologist immediately afterwards, I found him studying the map of England in connection with the problem of oil.

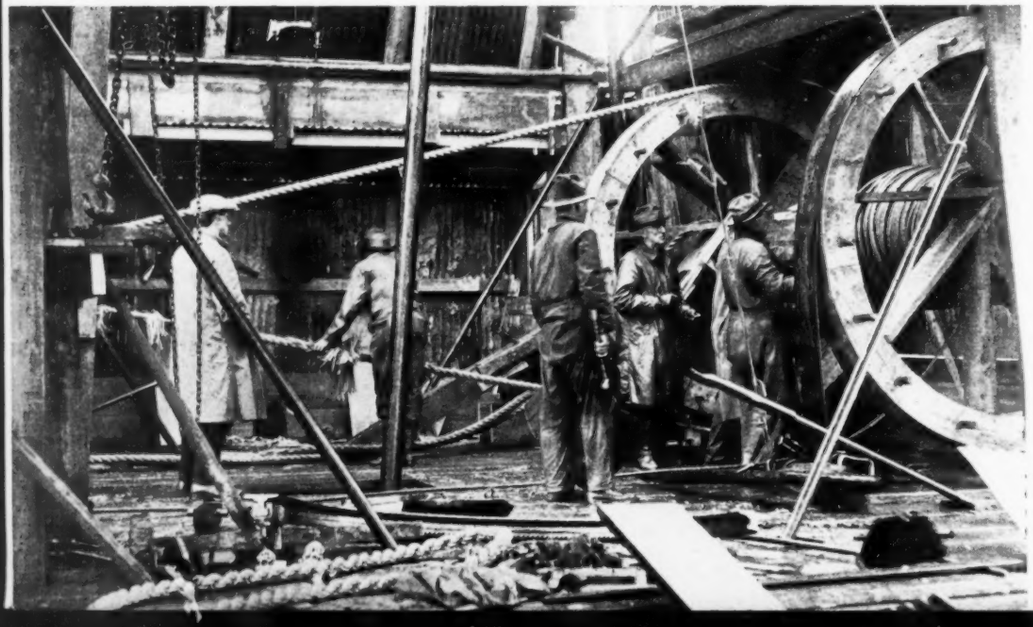
In a very short time an American geologist, E. L. Ickes, was busily engaged in the work, and soon afterwards certain owners of land were approached with a view to allowing drilling on their property. In the absence of any regulation to the contrary it was taken for granted that any agreement with them would follow the procedure of coal-mining, arrangements being made as to surface area, and on the basis of a royalty to be paid to the land-owner on oil produced.

All negotiations were ended when the Government brought in a Bill on August 15th, 1917, under which the Crown reserved the exclusive right to search and bore for petroleum in the United Kingdom. It was also provided that a sum of nine-pence per ton produced was to be paid into a special fund to be divided amongst the owners of land in the area. The Bill passed its first and second reading but in the next stage, the Committee, an amendment was carried against the Government, and refusing any payment to the owners of land in the form of royalty. The Government was most anxious that a home supply of oil should be proved, if in any way possible, and Lord Cowdray had sufficient confidence in the prospects of realization as to offer to undertake the trial. One condition, however, he laid down as essential, namely that a wide enough area should be reserved to him for the experiment. The Government, probably fearing that the cry of "Monopoly" would be raised against them, refused to grant this condition. Lord Cowdray then suggested that the former Bill should be withdrawn and another introduced suspending the question of the ownership of oil, but giving the Government the power to control drilling by the grant of licenses, so as to prevent promiscuous drilling. He then offered to place at the Government's disposal all the information that had been collected by his geologists, together with their services free of cost or profit if the Government would drill. The firm would act as Petroleum Development Managers, and an agreement to that effect was made with the Ministry of Munitions in September 1918. The sum of £1,000,000 was set aside for this purpose.

In the House of Lords Lord Cowdray was practically accused of having acquired a monopoly of the power to drill for oil, but in his speech (H of L, Nov. 6th 1918) he pointed out that he had given up all chance of any profit. He said that in America there had been immense loss of both oil and money owing to competitive and promiscuous drilling, and to prevent that experience in this country he had made a present to the government of valuable information. If the cry of monopoly were raised, it was to be found with the government and not with him.

Orders had already been given for what was required to commence drilling, and a staff of American drillers were on the way for England before the passing of the Act.

If I may introduce a personal note for a moment it is to say that a photograph was taken of V. L. Conaghan (the super-



Drilling operations with standard tools at Hardstoft

V. Conaghan, American drilling superintendent, and Col. Bathurst selecting the site for the Hardstoft well.

intendent) and myself selecting the site for the Hardstoft Well in a field of oat stubble with the stooks still standing. On that spot drilling was commenced on October 15th, 1918, and in the following May oil was struck at a depth of a little more than 3,000 ft.

To complete the narration of the legal or legislative aspect of the case, the requirement of a license to drill has held good during the intervening time. The bill recently introduced by the government, however, declares that property in oil is vested in the Crown, excepting the present holders of licenses, of whom there are three, whose rights are preserved. The opposition based on the argument that landowners are being deprived of the rights to oil derived from their land seems to lack substance. In the first place because the holders of licenses, who alone have proved their title, are excluded from the bill, and their rights are preserved. In the second place the declaration that the Crown claims the property of oil seems justified from the fact that the cost of the only scientific search by boring for oil was paid for out of the taxpayers' money.

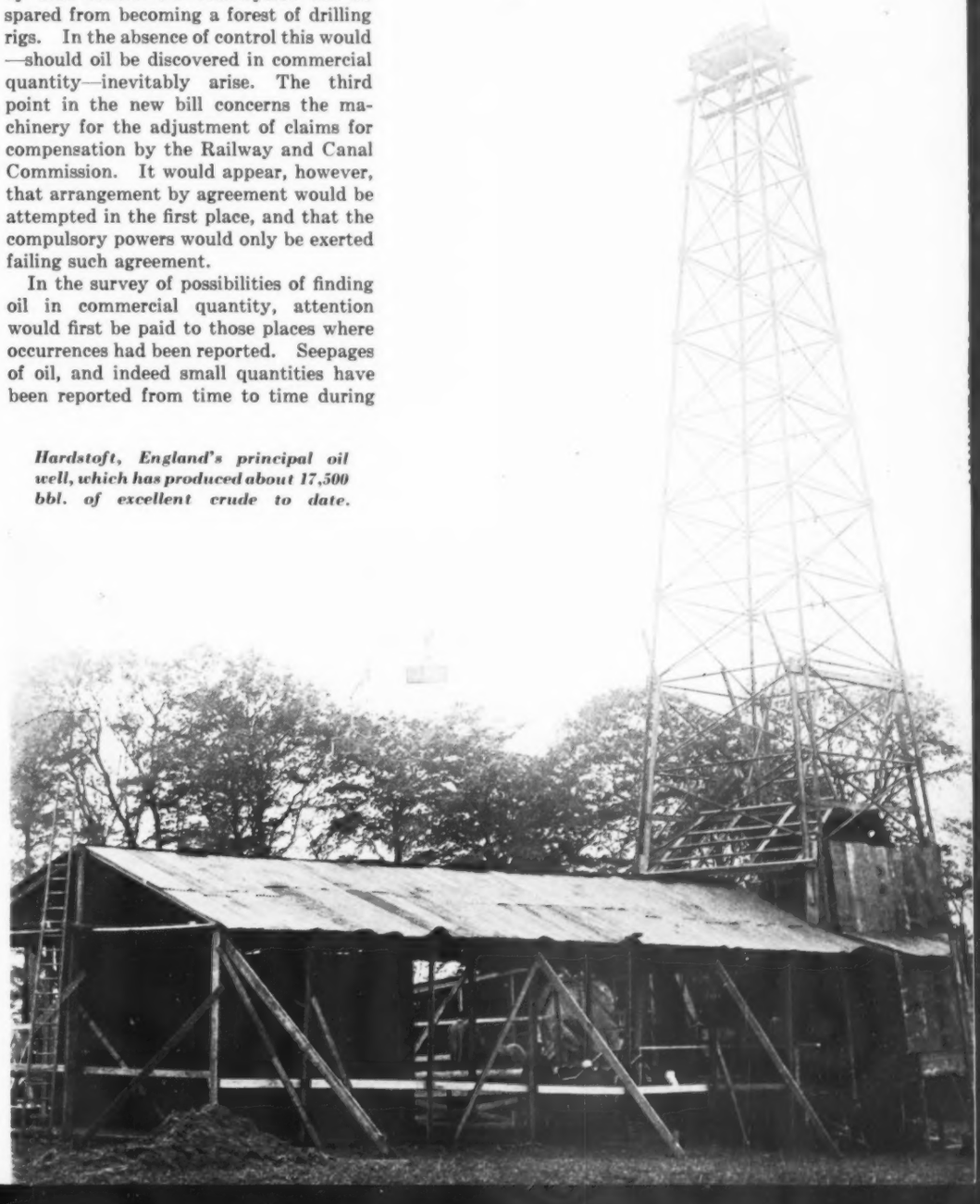
The second important provision of the new bill is that the Board of Trade issues the licenses to drill and controls the conditions of the undertaking. Perhaps in England the importance of control is not completely understood by the general public, for it may be misrepresented as official and officious interference with private enterprise. The applicant for a license will have to satisfy the Board of Trade that there is geological evidence as to the possibility of oil, which is meant to cut out wild schemes. He must also show that he has reasonable financial support for the scheme, and that it is a serious undertaking and not a mere bubble. Both the provisions I have named are founded on the experience of oil-producing countries. The declaration that property in oil is made before the formation of a vested interest of any proportion and the rights of the existing holders is preserved.

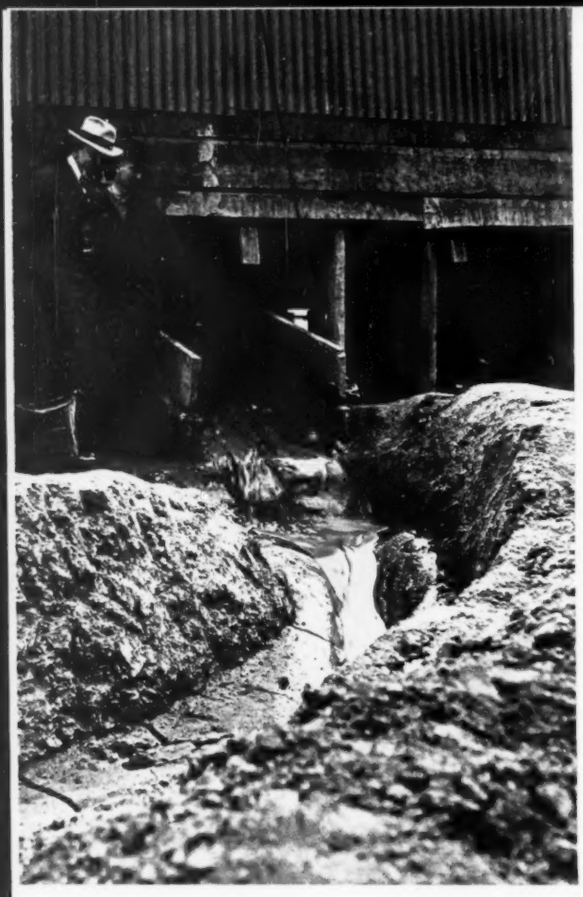
Instances could be given from other countries where private enterprises or public companies have commenced business under conditions specified in agreements. In several cases pressure has been exerted to change these conditions to the disadvantage of the pioneers of industry. If there is to be an oil industry in the United Kingdom it will be undertaken with the knowledge of the conditions clearly defined. Similarly, the industry will be conducted on lines of security from competitive drilling by unscrupulous rivals. The opponents of the bill do not seem to realize that the Board of Trade will act on behalf of the Crown, and that by that control the countryside will be spared from becoming a forest of drilling rigs. In the absence of control this would —should oil be discovered in commercial quantity—inevitably arise. The third point in the new bill concerns the machinery for the adjustment of claims for compensation by the Railway and Canal Commission. It would appear, however, that arrangement by agreement would be attempted in the first place, and that the compulsory powers would only be exerted failing such agreement.

In the survey of possibilities of finding oil in commercial quantity, attention would first be paid to those places where occurrences had been reported. Seepages of oil, and indeed small quantities have been reported from time to time during the last hundred years, and vaguely referred to before that, even so far back as the time of the Roman occupation. It is unnecessary to give details of these references, but Mr. Ickes, who looked over the sites of these occurrences, writes that he "has seen more abundant evidence in the limestone of Derbyshire than in the Tamasopa limestone outcrops of Mexico." Besides the geological study of the most promising areas, it must be mentioned that samples were submitted to a petroleum chemist, who was able to say what was the origin of the oil. As Mr. Ickes says, "his chemical work checked the geological in indicating a lower carboniferous derivation for the bulk of the material. His studies also enabled him to foretell closely the character of the crude ultimately found in drilling."

The scheme of the trial borings was framed on the following lines—"The outcropping rocks of the North of England are moderately deformed carboniferous. Along the Scottish border, these

Hardstoft, England's principal oil well, which has produced about 17,500 bbl. of excellent crude to date.





Oil flowing from Hardstoft No. 1 on June 3, 1919. The well is now on pump for small production.

are interrupted by a wide belt of highly folded Silurian with a northeasterly trend; beyond this in central Scotland, the carboniferous reappears in an isolated basin in the vicinity of Glasgow and Edinburgh". Mr. Ickes continues, "All the borings started, and presumably ended, in the carboniferous. Those in England were in two groups; one on the east side of the Pennines in Derbyshire, the other on the west side in North Staffordshire. The Scottish wells were located in the carboniferous basin near Edinburgh."

As to the results of the Government experiment Mr. Ickes writes,

"The results might be summarised by saying that of the ten structures drilled upon two yielded encouraging showing; three cannot be considered as having been adequately tested, and five produced dry holes, although in some of those small oil showings and gas were met."

The total depth drilled over all the wells was 40,047 ft. and five wells were 4,000 ft. or more, the rest being 1,810 ft. and 3,918 ft.

The total cost came to £564,000 in round figures, and in this connection it must be noted that the trial was made at a time when materials were excessively expensive, while the salaries that had to be paid to the drilling staff were paid in American dollars, when the exchange was very unfavourable to the United Kingdom.

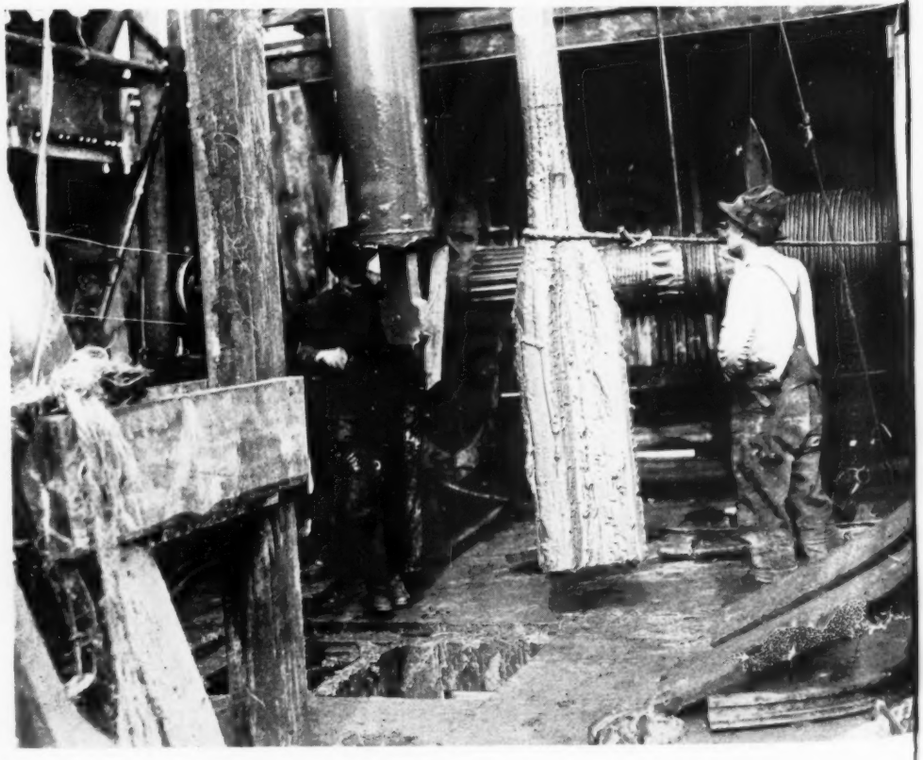
Some people may hold the opinion that the experiment was an expensive one, but it should be remembered that at the time no less than £8,000,000 was the daily expenditure in carrying on the war. The total amount spent (£564,000) thus represents something like two hours out of the twenty-four hours of war expenditure at that date.

Mr. Ickes, whose opinion is valuable as one familiar with oil enterprises abroad and from his experience in England, may again be quoted on the general aspect of the trial.

"Anyone acquainted with the hazards of wild cat drilling will acknowledge that eleven scattered wells are insufficient to test thoroughly a country having the size and geological conditions of the United Kingdom. The method of balancing the books by taking the difference between the cost of the prospecting to date and the return in oil sold, and writing it off as loss is, if anything, premature. It would be more reasonable to let the balancing rest with the future, until more work may have been done."

It certainly seems that any further attempt to search for oil in the United Kingdom is unlikely at present. Overproduction is the prevailing feature in the oil world, while there are many other good reasons why people may hesitate to attack the problem in England. The most likely regions are fairly thickly populated, and, unless the coal interests were willing to go into the venture there would be great difficulties in safeguarding the mines, actual or prospective. The advance of knowledge in obtaining oil and kindred products from coal would also appear to render what must be a great speculation less attractive.

Cable tools on the Hardstoft rig in 1919. Production came in from 3,075 ft.



Summary of Wells Drilled in England

Derbyshire Wells

Ridgeway. On a line between Sheffield and Chesterfield. Drilled to the depth of 2,898 ft. No oil, but had a strong flow (100,000 gallons per 24 hours) of hot salt water at 120 deg. F.

Renishaw. Between Sheffield and Chesterfield. Natural gas. At 1,580 ft., 200,000 c. ft. per 24 hours, and at 1,615 ft. 250,000 c. ft. At 3,198 ft. very salt water. Drilled to 4,100 ft.

Brimington. Between Chesterfield and Nottingham. No trace of oil in the carboniferous limestone. Drilled to 4,040 ft.

Heath. Between Chesterfield and Nottingham. A considerable show of gas at 1,875 and 2,615 ft. 450,000 c. ft. per 24 hours. Very small show of oil at 3,942 ft. and another at 3,988 ft. At 4,000 ft. a charge of dynamite was fired, but did not induce a flow of oil.

Hardstoft. Between Chesterfield and Nottingham. Oil met with at 3,075 ft. Natural flow 7 barrels per day increased to 14.6 by pumping. From May, 1920 until March 26th, 1923 this well had produced 1,088 tons of high quality oil.

Ironville I. Between Chesterfield and Nottingham. Drilled to 4,006 ft. Abandoned due to heavy flow of water.

Ironville II. Drilled to 3,630 ft. Traces of oil

at 2,500 and 3,604, but salt water gave trouble. A charge of dynamite fired at 3,630 ft. only giving slight show of oil.

Staffordshire Wells

Apedale I. Northwest of Stoke. Abandoned, tools being lost at 1,338 ft.

Apedale II. At 4,245 ft. salt water encountered which rose 800 ft. in borehole in 12 hours. 2,780 ft. of volcanic ash, which is unique in the Midlands, was passed through by the drill.

Werrington. Between Stoke and Derby. Drilling tools lost at 2,670 ft. Well abandoned.

Scottish Wells

West Calder. Drilled to 3,920 ft. with only traces of oil and gas.

D'Arcy. At 1,810 oil was struck, very similar to that of Hardstoft. Between July 22nd and September 16th, 1922, 7 tons of oil obtained. Operations were then suspended. Authorities regard this as a favorable indication of oil at greater depth.

Note: In the above list it will be seen that twelve wells are mentioned, whereas it has been reported that only eleven were drilled. The reason for this is the omission of the failure of the first attempt at Apedale, Staffs.

Spudding in Hardstoft No. 1. Lord Cowdray talking to his son in uniform.

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French Company Organized for African Drilling

FOR SEVERAL years the colonial government of French Equatorial East Africa, in collaboration with the home government through the Office National des Combustibles Liquides, has been conducting geological investigations for oil. The experts of the combined services have now found reason for believing in the existence of oil deposits in the Gabon and Middle Congo districts and preparations are under way to put down a series of test drillings.

The enterprise is being financed by an inter-governmental corporation chartered May 20 by the French government. One third of the capital stock (7,650,000 francs) of the new corporation, which is to be known as the Syndicate de Recherche de Petrole en Africa Equatorial Française, has been subscribed by the colonial government, one third by the O. N. C. L., and one third by the Compagnie Française des Petroles. The corporation is thus mainly a governmental affair and is closed to outsiders, the shares being nontransferable and no privileges for exploration can be sublet, but if oil is discovered privileges for operation may be granted to private interests. Jules Pineau, chief of the O. N. C. L., is president and general manager.

The Syndicate will have exclusive right to explore for oil in two districts, one bounded by the parallels of latitude 1 deg. N and 3 deg. S, the meridian 11 deg. East of Greenwich, and the Atlantic coast; the other district is bounded by the parallel of latitude 3 deg. S, the southern frontier of French Equatorial East Africa, the meridian 13 deg. East of Greenwich, and the Atlantic coast.

Any profits realized from the discovery of oil are to be shared equally by the three participants, subject to a royalty of not less than 12 percent in favor of the colonial government. The arrangement is practically an exact duplicate of the one concluded last year between the O. N. C. L., the C. F. P., and the colonial government of Madagascar, under which drilling for oil in that island has already begun.

Producing in a Polish field.

La Petrolea camp of the South American Gulf Oil Corp.

Cumarebo Crude Production Passes Peak

Results of 1933 Operations in Venezuela Indicate Continued Orderly Development. Quiriquire Production Increasing Rapidly in 1934. New Companies Registered.

By C. N. Clark

DURING 1933 crude oil production in Venezuela amounted to 17,293,193 bbl. of which 16,586,650 bbl. were exported. Some 132 wells were drilled a total footage of 339,298 ft. At the year end there were a total of 1,274 wells producing in Venezuela, of which 504 were flowing wells, 327 were producing under gaslift and 443 were pumping. During 1933 no refinery construction had been undertaken but construction progressed on the Quiriquire-Caripito pipeline and the sea loading line at Guiria, as well as on tankage for a capacity of 240,000 bbl.

Recent reports from the fields indicate that the Cumarebo field has passed its peak of production having produced 404,014 bbl. in January, 1934; 336,711 bbl. in February, 1934; and 359,583 bbl. in March, 1934. Exploration by the Standard of Venezuela is being intensified in an effort to locate another major pool capable of producing the high grade crude characteristic of the Cumarebo field.

Production at Quiriquire, however, is rapidly and steadily increasing and all developments indicate that this field is capable of immensely increased production. Operations in northern and eastern Venezuela carried on by Standard of Venezuela are extremely encouraging.

At the end of February, 1934, the Standard Oil Company of Venezuela was making rapid progress with the construction of three 80,000-bbl.tanks at the new loading port of Guiria, on the southerly side of the Paria peninsula of the state of Sucre. Five thousand feet of the 14-inch sea loading line had been laid down, and 1,600 ft. welded. The line is to be 7,600 ft. in length.

During the year 1933 two new petroleum companies were registered in Venezuela, the Trans Americas Petroleum Limited and the Orinoco Oilfields Limited, making the total number of oil companies registered in the country 125.

In his annual report, the Minister of Industry states that, in April, 1933, the period terminated during which the Venezuelan Oil Concessions, Ltd., could make its definite selections of petroleum areas for exploitation in the districts of Maracaibo and Bolivar in the state of Zulia, under its concession granted in February, 1907, to Gen. Antonio Aranguren, and the subordinate instruments and agreements.

The deposits reserved by the company in the Bolivar district cover an area of 327,261 hectares and those reserved in the Maracaibo district cover an area of 216,799 hectares.

Drilling, Production and Export Statistics for Venezuela for 1933

	Number of Wells Drilled	Footage Drilled	Wells on Production Dec. 31, 1933	Flowing	Gaslift	Pumping	Crude Production tons	Exports tons
L.P.C.	14	46,756	228	123	86	19	5,370,215	5,186,765
V.O.C.	61	132,815	514	193	106	215	4,806,581	4,834,724
S.O.V.	96	84,004	64	52	7	5	1,625,075	1,479,062
V.G.O.	1	2,157	229	67	11	151	2,471,825	2,716,954
B.C.O.	11	43,544	105	9	52	44	213,834	220,945
C.D.C.	5	19,507	30	21	..	9	945,800	945,812
C.P.C.	2	7,882	104	39	65	...	1,845,440	1,188,400
T.O.V.	...	...	...	...	...	...	12,248	13,986
C.A.E.	...	...	...	...	...	...	2,174	...
	132	339,298	1,274	504	327	443	17,293,193	16,586,650

L.P.C. (Lago Petroleum Co.), V.O.C. (Venezuelan Oil Concessions), S.O.V. (Standard Oil Company of Venezuela), V.G.O. (Venezuelan Gulf Oil Company), B.C.O. (British Controlled Oilfields of Venezuela, Ltd.), C.D.C. (Colon Development Company, Ltd.), C.P.C. (Caribbean Petroleum Company), T.O.V. (Tocuyo Oilfields of Venezuela, Ltd.) and C.A.E. (Central Area Exploration Company, Ltd.)

Bottle Proves Value in Ohio Test

Scientific Test Conducted by Ohio Oil Company Indicates Marketing Value of Glass Container for Lubricating Oils. Thirty Percent Increase in Sales Follows Introduction of Glass Bottles.

JUST WHAT effect does the packaging of oil in sealed glass containers have upon sales? That is the question that the Ohio Oil Company determined to settle when considering the possibility of adopting the tamper-proof glass bottle for their lubricating oil.

Ohio wanted the complete facts and decided to conduct a trial sales campaign from which original data could be obtained. This data when accumulated would serve as means of measuring the sales value of the sealed oil bottle because all other factors could be controlled.

Decision was made by the officials of the Ohio Oil Company to run a three months' test in Northwestern Ohio, beginning March 1, 1934.

Mr. H. G. Williams, manager of the Ohio Oil Company's advertising department, Findlay, Ohio, was placed in charge and early in April the bottled oil was ready for distribution to the stations.

Many details of the package had to be worked out in advance, however. A bottle was designed by Owens-Illinois Glass Company which utilized applied color lettering to identify the Linco Penn and Linco Marathon Brands. The process of applied color lettering is a development of Owens-Illinois and consists of applying a color design to a glass bottle which is made permanent by re-heating the bottles and fusing the color to the glass. This adds relatively little to the cost of the containers, and has a very definite value in merchandising the package.

Next the details of the seal had to be worked out. Ohio decided to use Aluminum Seal Company's "Goldy Seal" because of its tamper-proof features. This seal consists of a metal disc with cork composition liner held on by an aluminum band. The band is "wiped on" or crimped under the bottle lip flange. A second flange prohibits inserting any sort of a sharp instrument that might be used to pry under the band and tamper with the seal without destroying it. The band has a tab and when pulled tears the metal and opens the bottle but destroys the cap in so doing.

Caps were lithographed in keeping with the color scheme of the applied lettering on the bottle and the S.A.E. rating printed on the disc. Also the Ohio Oil Company's name was printed on the metal band where it could easily be seen by the consumer.

The Opaco metal crates of the Oil Products Appliance Company were adopted because of their sturdiness and efficiency in transporting the filled bottles. Also these crates served as a means of building mass displays at the service stations.

Twenty-four stations in the Northeastern Ohio territory extending east to Sandusky and south to Lima were included in the test. The choice of stations was such as would give a representative sales cross-section, including a metropolitan area (Toledo) smaller industrial centers, agricultural communities and rural crossroad settlements. The points included in the test were Toledo, Fremont, Bellevue, Sandusky, Alvardton, Pioneer, Fayette, Brian, Lima, Findlay, Van Buren, Portage, Mermill and Bowling Green.

In the stations selected for the test all "highboys" or bulk dispensers were removed. Handling only the sealed bottles, prohibited the motorist from thinking the bottle had been filled from bulk equipment, in the event the customer did not see the actual removal of the tamper-proof seal.

It was decided that the grades of oil to be sealed in glass should be of all required viscosities from S.A.E. No. 10 to No. 50, inclusive, both in Linco-Penn (100 percent Penn grade) and Linco Marathon.

The equipment required for the bottling plant in Findlay was inexpensive and occupied a minimum of floor space. This equipment consisted of a capping and sealing unit, a bottle washer, two hand-filling pumps, two twelve foot sectional draining conveyors, 500 metal cases of 16 bottles capacity each, 12 metal plates and a supply of tall quart oil bottles with Goldy Tamper-proof finish and the necessary lithographed "Goldy" seals.

Stake trucks were used to haul filled cases from the bottling plant in Findlay to the three bulk plants in Bellevue, Rudolph and Lima, and to bring the empties from the bulk plants back to the bottling plant.

Gasoline tank trucks moved the cases from the bulk station to the filling-stations, also returning the empties. The metal Opaco cases used are of such a design that they fit into the side carrying racks on each side of the truck body where under the old plan of bulk distribution, five and ten gallon containers were transported.

Weights were found to be as follows: empty case without bottles weighed 13½ lbs.; case filled with empty bottles weighed 43¾ lbs.; weight of oil in 16 bottles (1 case) 29 lbs. making the weight of a full case with filled bottles 73 lbs.

The trial sales campaign was backed up by a most intelligent advertising and mer-

chandising program to put across the advantages of the sealed glass bottle.

In planning the merchandising of the new package, particular stress was laid upon the uniformity of presentation to the public. The sales promotional problem was easily solved by assigning one man to the project. This individual acted as an instructor and covered all the 24 stations, giving the attendants directions on how best to merchandise to the consumer the advantages of the glass bottle. Each filling station attendant was fully trained on how to present the new package in the most effective possible way. Visibility of the product was made one of the chief keynotes of the campaign.

Attractively printed cutout folders of the new bottle carrying the message of the new package and the quality of the product were given out by station attendants to the motorists.

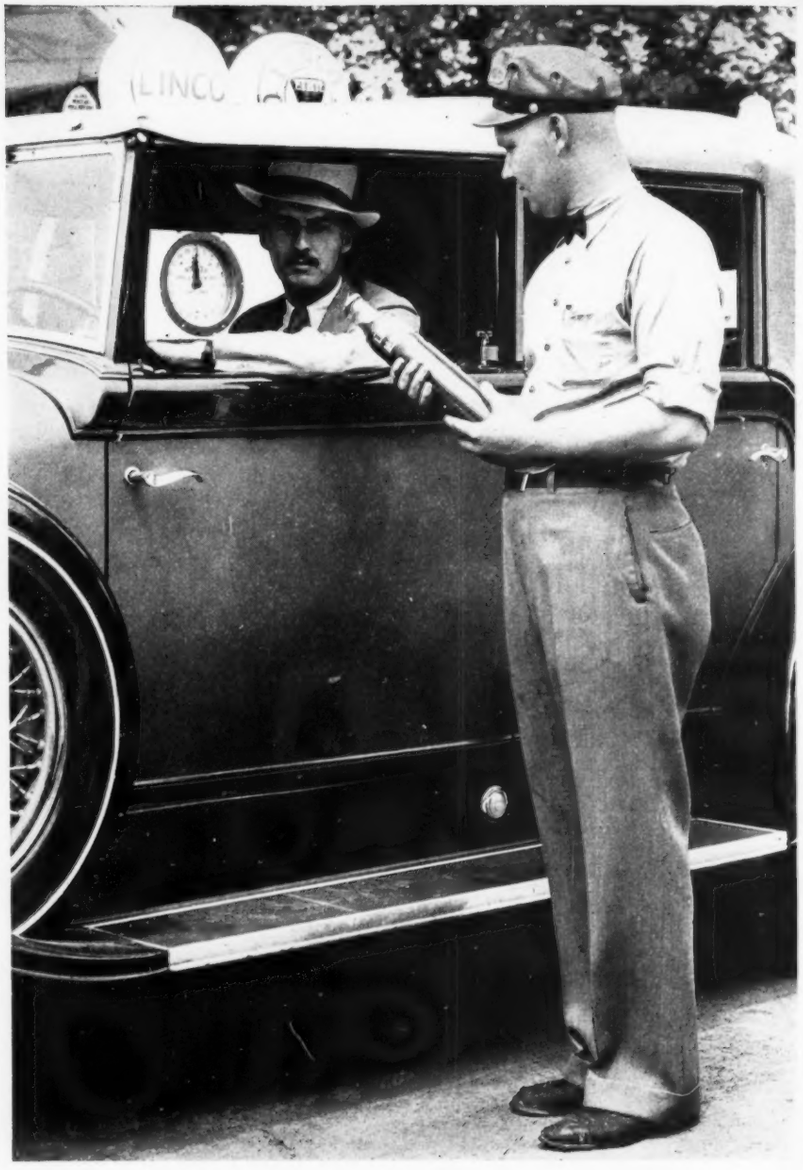
Road signs picturing the filled and sealed bottles were placed on routes contiguous to those stations merchandising the oil in glass.

An aluminum cutout of the bottle, six feet high, was anchored to the ground in front of each station. This was decorated in colors and lettered to give it a striking resemblance to the actual filled bottle.

Seven hundred-line advertisements were used in the newspapers of Bowling Green, Fremont, Sandusky, Lima and Bryan on March 1 and 15 and April 21 to announce the new tamper-proof glass package to the public.

The three months' test demonstrated a substantial increase in sales which could be clearly attributed to the glass package. Volume increase in "Linco-Penn" was over 30 percent with "Linco-Marathon" running a close second.

Customer acceptance of the tamper-proof sealed bottle proved it to be an important element in successful oil merchandising.



The Ohio test was accompanied by intelligent advertising efforts to familiarize the motorist with motor oil in sealed glass bottles.

Filling station attendants voted 100 percent in favor of the new package, enthusiastic over the ease and speed of handling, visibility of product, cleanliness and the fact that the new packaging brought no increase in price and no oil shortage as in "highboy" dispensing. The new selling points offered by the new package were thoroughly appreciated by filling-station attendants.

Results of the test have been tabulated from detailed records kept by the service stations and bulk distributing stations.

In addition to establishing the fact that with even these moderate introductory efforts, the tamper-proof glass bottles produced big sales increases, the Ohio Oil Company also found that bottle losses during a period of 45 days amounted to only .001 percent and that seals spoiled

in the operation of the same period were only .002 percent.

Even though the bottling operation during this trial period was conducted in more or less of a hit and miss manner, the costs were found to be remarkably low.

Measurements based on the pumping of oil from 40 steel drums into bottles showed an average loss of only four quarts per drum. Fifty percent of this loss was due to filling above the quart line in each bottle. The balance of the loss was charged to spillage and adhesion of oil to the inside of the drum.

Kerosene was used in washing the bottles for re-filling, but a solution of 2½ lbs. of Tri-Sodium Phosphate to 40 gals. of water at 150 deg. F. is being tried out in the belief that it will prove more satisfactory. This, of course, requires a steam connection into the washer.

As a result of the test campaign the Ohio Oil Company has decided to extend its use of Owens-Illinois glass containers for both of its oils in the entire state of Ohio, also in Ft. Wayne, Indiana, with a probable extension of their use to the entire states of Indiana and Illinois.

Plans are being made for a new plant at Kenton, Ohio, in which two operators with the assistance of the bulk plant man will bottle a minimum of 4,000 to 5,000 gal. per month—an average of approximately 31 gal. per hour. The 40 ft. x 40 ft. bottling room will be well lighted and equipped with a washer, a sealing machine, two conveyors and a motor pump with displacement capacity of 16 qts. per minute.

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Anglo-American Chairman Reviews Advantages of Packaging

SPEAKING at the opening of the Modern Packaging Exhibition on June 1, at London, Frederick J. Wolfe, chairman, Anglo-American Oil Co., Ltd., said:

Frederick J. Wolfe

IN THE packing of oil products, the Anglo-American Oil Company may claim to be pioneers, for they were the first company to distribute petrol in the familiar two-gallon cans, first with petrol pumps, and—as recently as last year—first to market motor oil in branded sealed glass bottles.

Our packages—for such they may be regarded—range from the five-and-a-half million gallon petrol tanker, rail tankcars and various types of road vehicles, down to the pint bottle of Essolube motor oil, whilst the by-products marketed by our associated companies cover scores of lines, from medicinal and household goods, germicides and beauty preparations, to oil illuminants, heating and cooking fuels for every purpose, and branded road materials which help to build millions of miles of highway in practically every country of the world.

In all this vast chain of products we have, throughout the past half-a-century, placed the highest valuation on the branded container, regarding it as second only in importance to the quality of the product.

It was this policy which led us to determine upon a revolutionary new package in the introduction of Essolube. We were entering a market so strongly held by our competitors as to appear almost impregnable, and we realised that to gain a place it was imperative for us not only to give the public a more highly developed oil, but to present the new oil in a form which would appeal to the motorist by reason of its novelty and attractiveness, and practical advantages.

We reached the conclusion that the method of selling oil to the motorist through the medium of measures and funnels exposed to dust, dirt and damp, was obsolete. We, therefore, worked upon a container which would give the motorist a positive guarantee of cleanliness as well as quality and quantity, and one which would save him time at the filling station. Ultimately we decided upon the now well-known Essolube bottle, which, whilst reducing container costs to a minimum for ourselves, gives the motorist the outstanding advantage of seeing the product, and receiving his oil as fresh and clean as the morning milk arrives in its bottle.

The reception of this oil in its new package quickly established that we were justified in this pioneer step, and that the public is always quick to appreciate packing developments which simplify their buying and protect their interests.

There is one point the significance of which all will fully realise. I refer to the supreme importance of seeing that the whole world is informed of the branded package, through the advertising columns of the press, supported by the widest possible display on the poster hoardings. Only in this way can a good container be made familiar to the public, maintained in the confidence of the retailer, and protected from the risk of substitution or counterfeit.

Opaco steel crates of the type used for transportation and display purposes for bottled motor oil in the United States.

Results of Shell's Wood River Installation

Operating Data and Complete Description of True Vapor Phase Process Installed at Wood River by Shell Show Excellent Results and Unusual Features. By W. W. Holland and A. P. Sachs.

Petroleum Conversion Corp.
New York City

FOR three years the T.V.P. Process has been in commercial operation at the Shell Petroleum Corp's plant at Wood River, Ill. During this time the industry has awaited with growing interest definite news of the results achieved by this unique installation. It is now WORLD PETROLEUM'S exclusive privilege to publish a full account of the operation of this installation written by W. W. Holland, and A. P. Sachs, well-known refinery engineers of the Petroleum Conversion Corporation. Petroleum Conversion Corporation is the sole owner of the T.V.P. Process in the United States; outside the United States, N. V. Nieuwe Octrooi Maatschappij of The Hague, 50 percent controlled by The Bataafsche Petroleum Corp., and 50 percent controlled by Petroleum Conversion Corp., own all rights in the T.V.P. Process.

THE T.V.P. (True Vapor Phase) Process has been in successful commercial operation in the Shell refinery at Wood's River since 1931. This single unit has produced over 100,000,000 gals. of high anti-knock gasoline, every gallon of which has been used for blending with gasoline of lower octane rating from other cracking processes or with straight-run gasoline.

The T.V.P. Process is the only process in full commercial use which operates under *true* vapor phase cracking conditions. The cracking zone is absolutely free from liquid particles, which is an essential condition if the deposition of carbon is to be avoided completely.

The process is simplicity itself. No simpler application of the principles of cracking can be imagined. The oil is first vaporized *without cracking* in standard petroleum engineering equipment. The vapors are then thoroughly dried, superheated without any appreciable cracking, and intimately commingled with a large volume of hot heat-carrier gas in a mixing chamber at the entrance to the cracking zone. The mix then passes into the cracking or reaction chamber where the conversion or cracking takes place. The arrangement of equipment is indicated in the accompanying figure.

The above procedure of mingling the dry superheated vapor with the hot heat-carrier gas results in an instantaneous equalization of temperature at the degree chosen for the cracking in any given case. The mix-temperature is controlled with a high degree of accuracy, and the complete uniformity of temperature throughout the entire volume prevents overheating or underheating. Prevention of overheating leads to minimum gas production; prevention of underheating leads to maximum gasoline production. The instantaneous rise to the desired cracking temperature insures that no cracking occurs of the sort which lower temperatures produce.

The presence of a large volume of heat-carrier gas, which does not enter into the cracking reaction (except as a heat-carrying medium) and hence does not fall in temperature, acts as a flywheel in the reaction zone tending to prevent a drop in temperature. Thus the presence of the heat-carrier gas actually lessens the drop in temperature between the entrance to and the exit from the cracking zone. This has an important bearing upon the conversion percentage and the character of the product because, for a given initial temperature, a higher average temperature is maintained, with smaller deviations from the average temperature. The once-through conversion also known as the single-pass conversion is unusually high for the T.V.P. Process.

The heating system of a T.V.P. unit consists of two parts; first, a tube-still heater, and, second, a series of regenerative furnaces called "stoves," which heat the heat-carrier gas to a temperature considerably above that at which the charging stock is to be cracked.

The tube-still heater is divided into two sections. The first or vaporizer section heats the liquid oil to a temperature at which most of it will vaporize when flashed. The entire vaporizer charge is transferred to a flash drum, where vaporization is facilitated by the introduction of hot flash gas. This hot flash gas acts exactly like highly superheated steam in assisting distillation and carrying over of vapors. The effect is due to the familiar drop in partial pressure occurring whenever steam or other light vapor or gas is introduced into a distilling mass.

The flash drum is designed to prevent liquid entrainment and to yield a clean vapor. The second section of the tube-still heater receives this clean vapor. This superheater section heats the dry clean vapor rapidly with a minimum of cracking to a temperature of the order of 950 deg. F. With the small time factor used practically no cracking occurs at this temperature.

Let us now consider the stoves. Their function is to heat the heat-carrier gas. The cracking stock does not enter the stoves and consequently there can be no cracking of the liquid raw materials in the stoves.

The stoves are of the conventional blast furnace type so successfully used in the pig-iron industry for decades to preheat the air for the blast furnace. In the T.V.P. Process the stoves are heated in the usual manner, gas being burned in the combustion chamber and the combustion gases being carried by natural draft downward through a mass of brick checkers until sufficient heat has been stored in the brick. The hot bricks are then used to heat a current of heat-carrier gas which passes over them. Three stoves are used:

one is on blast (i.e., heating the heat-carrier gas), one is relatively cool, having just gone off blast, and one is relatively hot, preparing to go on blast. There is practically no pressure drop across the stoves. It is possible to operate on two stoves, so that in the rare case of stove trouble, the cracking unit continues operations unhindered.

The reaction or cracking zone is merely an insulated cylinder of such a size that the mixture of heat-carrier gas and oil vapor passes through it in a period of time suitable for the optimum production of gasoline at the selected reaction temperature. Control of the cracking temperature is one of the most important features of the T.V.P. Process and automatic devices are provided which regulate the temperature most rigidly.

The entire products of cracking are in gaseous or vapor condition and on leaving the cracking zone pass into the recovery system which consists of a scrubber, a rectifier, a condenser, and an absorber.

The scrubber, which is actually a preliminary rectifier, receives the total products from the cracking chamber. The gaseous cracked products pass upward through the scrubber countercurrent to a descending stream of liquid, consisting of flash-drum bottoms and recirculated bottoms from the scrubber itself. Fresh charging stock, if this contains no light fractions in the gasoline and naphtha range, may also be used as scrubber washing liquid. (However, fresh charging stock is ordinarily supplied directly to the tube-still heating unit and not to the scrubber.)

As the scrubber receives from the cracking chamber a mixture of oil vapors and of incondensible heat-carrier gas, it operates under the now familiar partial pressure conditions. The heat-carrier gas having performed its function of providing heat for cracking now assists in the distillation which occurs in the scrubber. The partial pressure distillation in the scrubber, equivalent to a steam distillation with large quantities of superheated steam, leads to a deep cut into the hot residuums in the scrubber and provides large quantities of clean overhead stocks which in turn serve as fresh or recycle cracking stocks.

Furthermore, the final residuum from the scrubber is thoroughly viscosity-broken, yielding a fuel oil of excellent viscosity characteristics, namely about 74 seconds Saybolt Universal at 100 deg. F. as shown in Table I. Commercially this fuel oil commands a premium for use in road oil mixtures. In case crude oil is used as charging stock and this crude is of asphaltic base, the residuum can be reduced to an excellent high melting-point unblown asphalt.

The scrubber is followed by a rectifier, which is a standard bubble tower. Owing to the continuing partial pressure of the incondensible heat-carrier gas, the top temperature of the rectifier (which permits all gasoline to pass over as overhead distillate) is about 100 deg. F. below the end-point of the distillate to be collected. For example, a 410 deg. F. end-point distillate would come over the rectifier at about 300 deg. F. This low temperature distillation of the gasoline distillate leads to an extremely low content of gum-forming constituents and provides a very simple treating problem.

The entire overhead passes to a condenser where the major portion of the gasoline distillate is condensed. The cold gas which originally served as heat-carrier gas passes to an absorber which removes the light gasoline fractions remaining in the gas.

The absorber is of the oil-to-gas type in which the cold gas is washed by cold absorption oil. The gas consists not only of the cold heat-carrier gas, but also of the flash-gas and the incondensible gas produced in the process of cracking. The cold absorption oil, known as lean oil, acquires a certain amount of heat during the absorption process and becomes loaded with light gasoline; the rich absorption oil, known as fat oil, passes continuously to a stripping still in which the light gasoline is removed and added to the major portion of the gasoline previously condensed out.

The corrosive action of substances common in petroleum, such as sulfur, is chiefly operative at temperatures within the cracking range. In the T.V.P. Process the stoves, hot gas mains, reaction chamber and scrubber are lined with brick and consequently these large units are completely free from corrosion.

The T.V.P. Process produces no coke or carbon. The rate of heating is so rapid and the time factor so small in the tubular still units that no appreciable cracking occurs in these tubes. Runs of over 60 days without the deposition of enough carbon to require cleaning the tubes have been followed by additional runs of equal length. There was complete absence of coke in the tubes after a run of 79 days of continuous operation with vapor charges to the superheater as high as 10 bbl. per minute.

This failure to produce coke or carbon may seem unusual but it is definitely the case in the T.V.P. Process. At most a small quantity of extremely fine lampblack is sometimes found at the bottom of the cracking chamber. Any of this lampblack which may be carried along by the gas stream, is washed out in the scrubber, but the minuteness of the amount so carried over is attested by the fact that the B.S. & W. of T.V.P. fuel oil is always abnormally low, about 0.2 per cent.

The durations of the last seven runs of the T.V.P. unit were 63, 71, 62, 51, 42, 70 and 79 days respectively, a total of 438 days, or an average length of 62.57 days. In not one of these cases was the unit shut down on account of carbon or coke formation. The principal cause of shut-down was the routine necessity for inspecting tubes in the tubular-stills, cleaning tube bundles in condensers and heat-exchangers, etc.

During the above period the total fresh charging stock amounted to 2,443,941 bbl., an average of 5,579 bbl. per stream day.

Composite Charge in the Last of Seven Runs in T.V.P. Unit. Table I

	Percent
Gas Oil, 35–36 deg. A.P.I.	52.57
Recharging stock (P. D. Bottoms), 34–36 deg. A.P.I.	10.18
Naphtha (cracked & straight-run), 46 deg. A.P.I.	17.44
Distillate, 50 deg. A.P.I.	9.56
Refractory stock (Cross bub. tower bottoms), 25–30 deg. A.P.I.	2.46
No. 3 Fuel Oil, 33 deg. A.P.I.	5.57
Treating tower bottoms (Lachman), 13.1 A.P.I.	.60
Stripping tower bottoms (Lachman), 28.4 A.P.I.	1.40
No. 1 Fuel Oil, 40 deg. A.P.I.	.14
Cracked slop, 31 deg. A.P.I.	.04
Other fuel oil	.04
Total	100.00

Yields Obtained

	Percent
T.V.P. distillate	61.6
Fuel oil, 15.3 A.P.I., 74 S.U. vis. at 100 deg. F.	24.3
Gas	13.3
Loss	.8
	100.0
Finished gasoline, 400 deg. F. end-point, 72.5 MM Oct. No.	57.3

It is obvious from an inspection of specifications of the products given in the accompanying Table II that the Shell unit was not run for the maximum gasoline production, but to suit the special requirements of the refinery, which were for a high-grade fuel oil in addition to the gasoline. Special attention is called to the grade of fuel oil produced, 15.3 A.P.I. gravity, with 55 percent off at 600 deg. F., and S.U. Vis. at 100 deg. F. of 74 sec. This fuel oil was desired for specific purposes and the T.V.P. unit was run accordingly.

The yield of 400 deg. F. end-point gasoline is 57.3 percent. If the fuel oil residuum is run to Bunker C specifications about 8 percent more distillate can be produced, a total of 69.6 percent instead of 61.6 percent. The yield of finished gasoline is then 64.8 percent instead of 57.3 percent.

Attention is also called to the relatively

high percentage of light fractions in the charging stock, with 30 percent off at 424 deg. F. It should be pointed out, however, that these light fractions consisting mainly of cracked pressure distillate bottoms from liquid phase operations are highly refractory and difficult to crack except by the T.V.P. Process. The charge also contained some straight-run naphtha of low octane rating which was reformed in the process.

T.V.P. gasoline is the heaviest gasoline on the market. It is now fully recognized that octane number up to a certain point is desirable and even necessary, but is neither necessary nor even desirable above this point. For example, if a given engine functions under all circumstances perfectly with a gasoline of 69 octane number, no improvement in the performance of that engine can be obtained with a gasoline of 73 octane number. But, if we have two gasolines of the same octane number, the one with the greater density and the more pounds per gallon will give the greater mileage in exact proportion to its greater weight. Hence, additional weight per unit volume is a desirable quality.

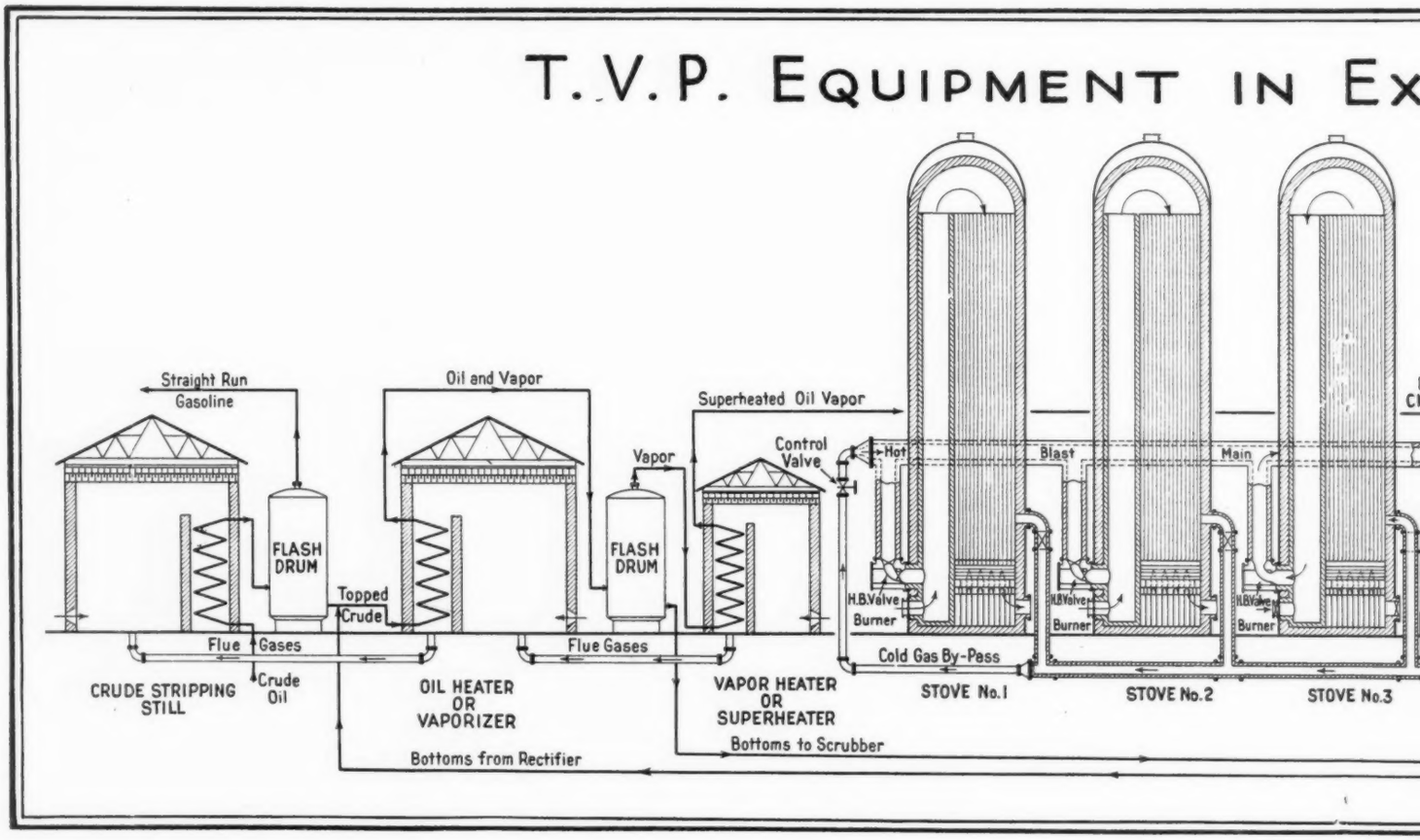
Octane rating of T.V.P. gasoline is so high that it is used to blend lower grade straight-run and other cracked products up to standard. In addition it contains another valuable property. For example, a gasoline reformed by liquid phase equipment and the usual T.V.P. gasoline may be compared. Both gasolines have approximately the same distillation range, but the T.V.P. is higher in octane number. The reformed gasoline is 65.9 deg. A.P.I. or 5.949 lbs. per gal.; the T.V.P. gasoline is 49.6 deg. A.P.I. or 6.490 lbs. per gal. The T.V.P. gasoline is 9.1 percent heavier and will yield 9.1 percent more mileage. This has been proved conclusively by independent investigators.* T.V.P. gasoline has been produced as heavy as 45 deg. A.P.I. or 6.661 lbs. per gal.

T.V.P. gasoline is a thoroughly stable product. The induction period as determined by the accelerated aging test averages 4+ hours. The gum content of the gasoline after four hours exposure to oxygen under the conditions of the above test averages about 15 mgs/100 cc., which is certainly an extremely low and desirable figure.

T.V.P. gasoline has never required a gum inhibitor and there has been no tendency to deposit gum even upon long standing in storage. A sample of this gasoline, which is now seven years old, and has been frequently exposed to the air, shows absolutely no visible trace of gum. The explanation of this probably lies partly in the fact that cracking takes place under conditions entirely free from oxygen, carbon monoxide or carbon dioxide, and at relatively low temperatures, of the order of 990 deg. to 1000 deg. F. Higher cracking temperatures tend to produce larger quantities of gum-forming constituents.

Another important factor in the gum stability of T.V.P. gasoline is the manner in which it is fractionated in the cracking process itself. It is well known that very careful fractionation without excessive heating, preferably with the aid of open steam, will remove most of the gum-forming constituents. The operating conditions of a T.V.P. unit are such that the top temperature of the rectifier is about 100 deg. F. below the end point of

*Hubner and Murphy, REFINER, page 189, May 1934; Brown and Singer, OIL & GAS JOURNAL, page 14, February 19, 1934.



the distillate. This is equivalent to producing unrefined pressure distillate from the products of cracking by a low temperature distillation of about 300 deg. F. The T.V.P. distillation in the presence of the cycle gas in the rectifier is fully equivalent to a steam distillation.

In liquid phase operations the conditions are essentially reversed; the pressure being high, the temperature of the distilling vapor must be considerably above the 300 deg. F. temperature of the T.V.P. unit in order to yield a distillate with an end-point of 400 deg. F.

Since T.V.P. distillate is produced under conditions which eliminate the major part of the gum-forming constituents, the subsequent treatment and rerunning at low temperatures with the aid of open steam remove almost completely all gum-forming constituents and yield a stable gasoline requiring no inhibitor.

Substantial proof of the above is the fact that during the past three years the T.V.P. unit has produced over 100,000,000 gal. of high anti-knock, stable gasoline without ever having used a gum-inhibitor and without ever having had a complaint of the stability of the gasoline.

This may seem remarkable to those whose experience is either with high temperature vapor phase cracking, i.e., 1075 deg. to 1100 deg. F., or with processes using combustion gases as the heat-carrier medium which produce oxygenated compounds which are themselves active gum accelerators.

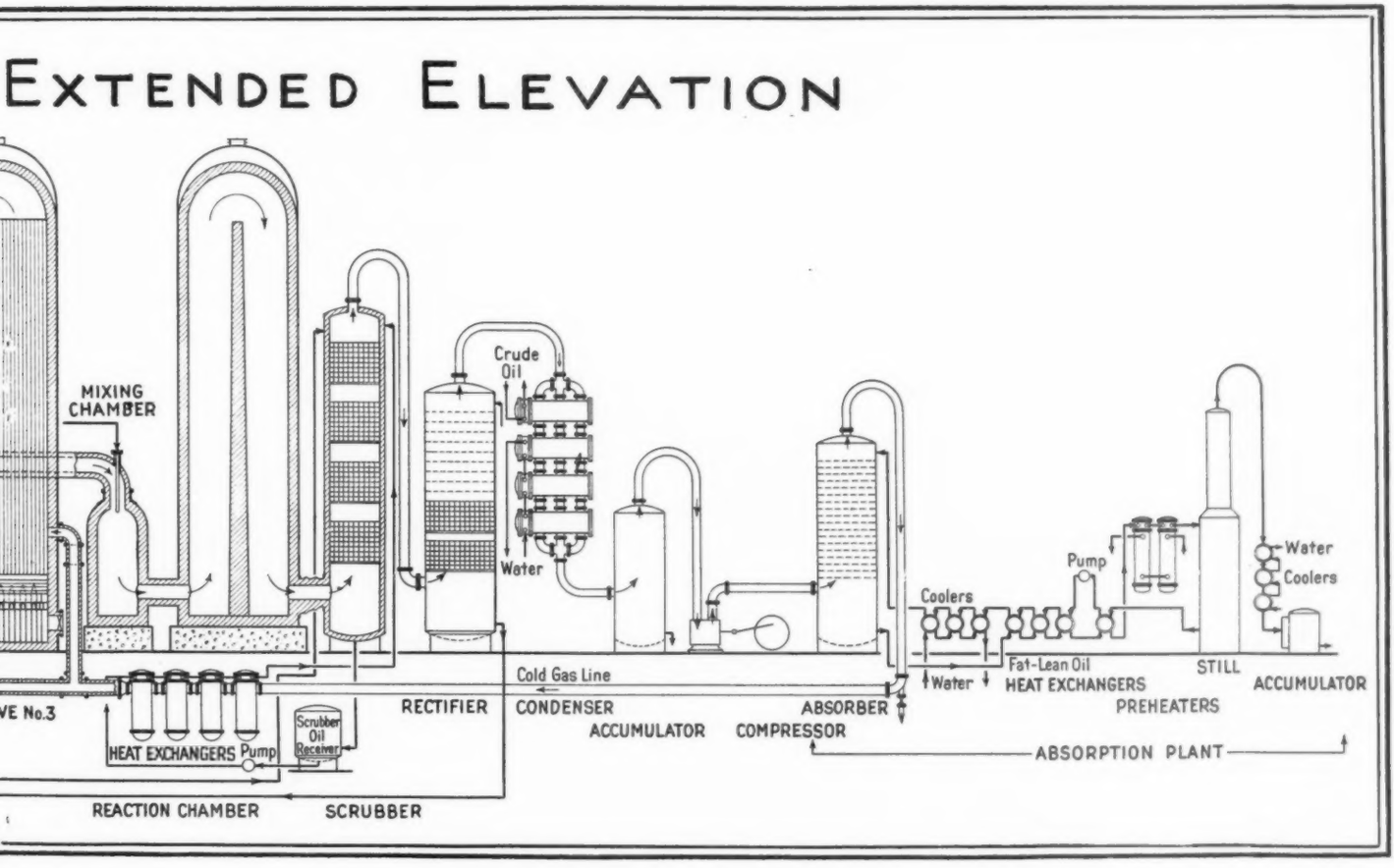
It is not too much to say that T.V.P. gasoline not only does not require an inhibitor to insure its stability, but that the gasoline itself has certain gum-inhibiting qualities. In substantiation of this statement the following is offered: A sample of T.V.P. gasoline having a gum content of 4 mgs. was blended, 20–80, with a sample of West Texas gasoline of gum content of 12 mgs. The gum content of the blend was only 1 mg./100 cc., indicating that T.V.P. actually inhibits gum formation.

T.V.P. distillate may be treated by any of the well-known methods, acid, clay or zinc chloride. The loss in octane rating is comparatively small when T.V.P. gasoline is treated with sulfuric acid. Millions of gallons of the distillate have been treated in this manner. The zinc chloride method (Lachman process) has also proved quite satisfactory. There is no loss in octane rating, the recovery is high, and the cost compares favorably with any of the other methods.

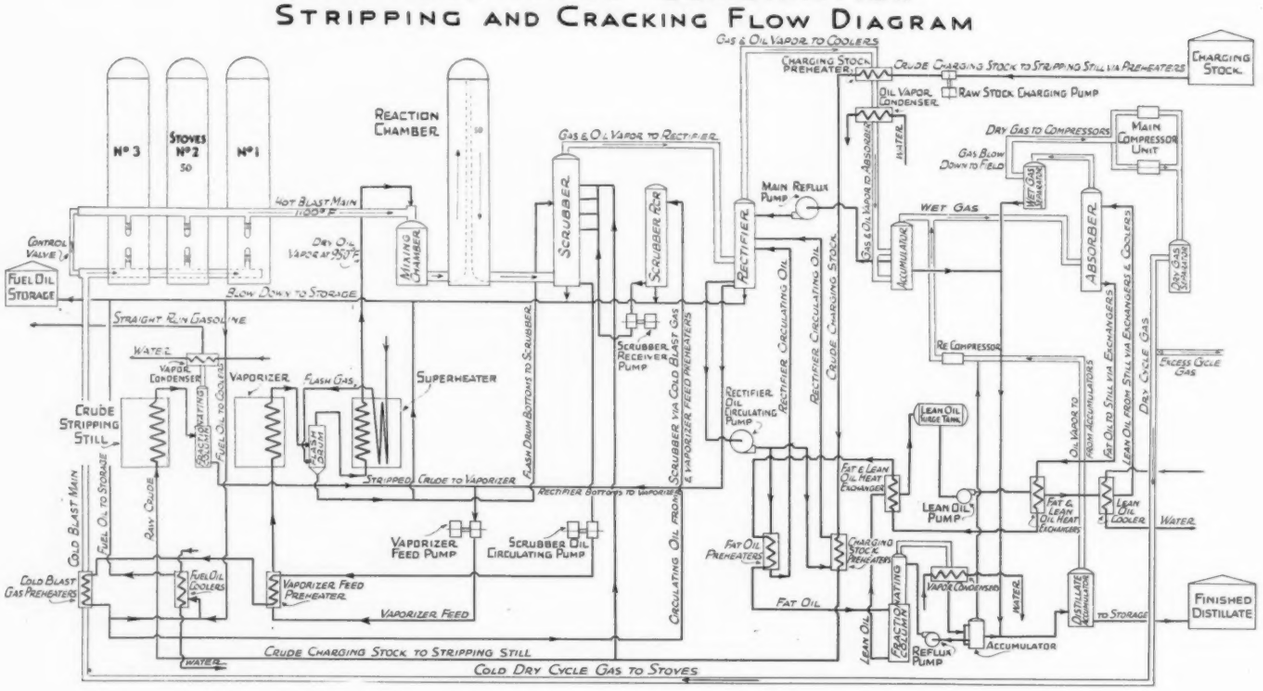
The sulfur content of the finished gasoline is quite satisfactory. As shown in the complete table of properties of T.V.P. gasoline, the sulfur content was 0.09 percent. Current sulfur content runs about 0.07 percent. The cracking temperature of about 1000 deg. F. converts a considerable part of the sulfur in the raw charge into hydrogen sulfide, which passes into the gas stream and is removed from the system; a large part of the remaining sulfur is concentrated in the various residuums.

Absolutely satisfactory color is easily obtainable with any of the standard treating methods. For example, Lachman treating yields a 30+ color without any difficulty.

The heat-carrier gas used in the T.V.P. Process is the gas produced by the cracking operation itself after it has been stripped of all fractions desirable for motor fuel, i.e., the lean gas. It consists of about 80–85 percent hydrogen and methane, the remaining 15–20 percent being chiefly ethane and ethylene with smaller



TRUE VAPOR PHASE COMBINATION STRIPPING AND CRACKING FLOW DIAGRAM



quantities of propane and propylene. Its specific gravity is about 0.65 to 0.7. This gas is heated in the stoves to a degree above the desired reaction temperature. Its temperature is kept constant by automatically bleeding small quantities of cold lean gas into the hot gas main, reducing the same gradually to zero as the blasting cycle proceeds.

The heat-carrier gas enters the mixing chamber at about 1100 deg. F. where it is most thoroughly and instantaneously mixed with the oil vapor which has been heated at an exceedingly high rate in the radiant section of the superheater to about 950 deg. F. The rate of heating in the superheater is so rapid and the time factor so extremely small that no appreciable cracking takes place in the tubes.

Evidence of this condition is the complete absence of coke in the superheater tubes after a continuous operating period of 79 days.

The optimum temperature for cracking in the vapor phase, such as we are considering here, is about 980–1020 deg. F. By the proper automatic regulation of the two streams, heat-carrier gas and oil vapor entering the mixing chamber, the desired cracking temperature is attained and controlled without the slightest difficulty. Having gained the desired objective in this unique manner, it is only necessary to maintain the temperature for the proper length of time to complete the reaction. This is readily accomplished in the reaction chamber, which is designed to give the correct reaction time.

In all other cracking processes, either liquid or vapor phase, the desired cracking temperature is achieved by the transfer of heat to the charging stock through the walls of metal tubes with resultant irregular heating, overheating and underheating. This is conspicuously evidenced by the numerous articles and discussions on the subject of "skin temperature" immediately within the metal tube walls. The T.V.P. Process, on the other hand, utilizes the novel principle of mixing directly together a relatively inert gas heated to a temperature above the cracking reaction and oil vapor at a temperature just below the cracking reaction, under the conditions obtaining in the process, thus completely avoiding the disadvantages of indirect heat transfer through metal tube walls. The direct transfer of heat from gas to vapor is perfectly uniform and must be necessarily instantaneous under the existing circumstances. There can be no lag in heat transfer under such operating conditions.

A satisfactory ratio between the heat-carrier gas and the oil vapor is 4:10 on the weight basis. On the volume basis, however, due to the difference in density, the ratio is 4 volumes of gas to 1 of vapor, the oil vapor being about ten times as dense as the heat-carrier gas.

The T.V.P. Process operates at a gauge pressure of about 50 lbs. per sq. in., or 65 lbs. absolute. Therefore, since the volume ratio of gas to vapor is 4:1, the partial pressure of heat-carrier gas is $\frac{4}{5}$ths of 65 pounds or 52 lbs. per sq. in., and that of the oil vapor 13 lbs. per sq. in., or less than atmospheric pressure.

It can be shown that operating under these partial pressure conditions vaporization in the distilling units of the equipment is most effective. The conditions in the scrubber are such that the heaviest gas oil fractions may be thoroughly removed from the residue and carried over into the bubble tower from which they are returned to the cracking cycle.

As an example of the effectiveness of this partial pressure principle in the operation, the following is given: A West Texas residuum with 32.5 percent distilling over in a laboratory test at 600 deg. F. actually distilled over 70 percent in the T.V.P. scrubber, with a top temperature of 600 deg. F. The scrubber can therefore be relied upon to make as deep a cut as desired into any material supplied to it.

By regulating the degree of recircula-

tion of the scrubber bottoms the gravity can be very closely controlled. For example, if extensive recirculation is employed, the tower top temperature is lowered with the increased reflux, and the residue becomes lighter. If the circulation is limited, less heat is removed, the top temperature rises and additional fractions distill out, leaving a heavier residue of lower A.P.I. deg.

In the case of an asphalt base crude the scrubber can be operated to remove all volatile material, yielding a residue asphalt of suitably high melting point.

Cooling for the rectifier column is provided by returning to the top of the tower a portion of the condensate; also by recirculating cooled rectifier bottoms which have been in heat interchange with the fresh feed or fat oil from the absorber.

Time and temperature are the important factors in any cracking operation. They must be accurately predetermined and then accurately controlled. They may be calculated or determined from previous experience, but in any case the control must be exact.

The T.V.P. Process is specifically designed for accurate time and temperature control. The cracking temperature is attained as a result of the commingling of two streams of gas under highly turbulent conditions. One is heated to about 1100 deg. F. and the other to about 950 deg. F. These two streams are separately controlled as to temperature, and as the difference in temperature is only about 150 deg. F., and as each stream is kept steady in volume and temperature, the mix temperature is inherently constant. Any change in temperature will be slow and gradual and may be corrected by equally slow and gradual means. Fluctuations in temperatures, therefore, do not occur.

The reaction chamber provides the necessary time for cracking. If, for instance, it is desired to alter the cracking temperature and the time of reaction, such a change is made by altering the rate at which either the oil vapor or hot gas, or both, are supplied, and simultaneously the gas temperature is raised or lowered, as desired, and the newly established rates are kept constant.

The recycle ratio of the T.V.P. Process, i.e., the ratio of material which is recycled or returned to the system for recracking, as compared to fresh charge, is about 0.85:1. This means that for every barrel of fresh gas oil charge fed into the system, 1.85 bbl. will pass through the superheater and reaction chamber. The conversion rate per pass is about 35 percent. This is an extremely low recycle ratio and an extremely high conversion rate.

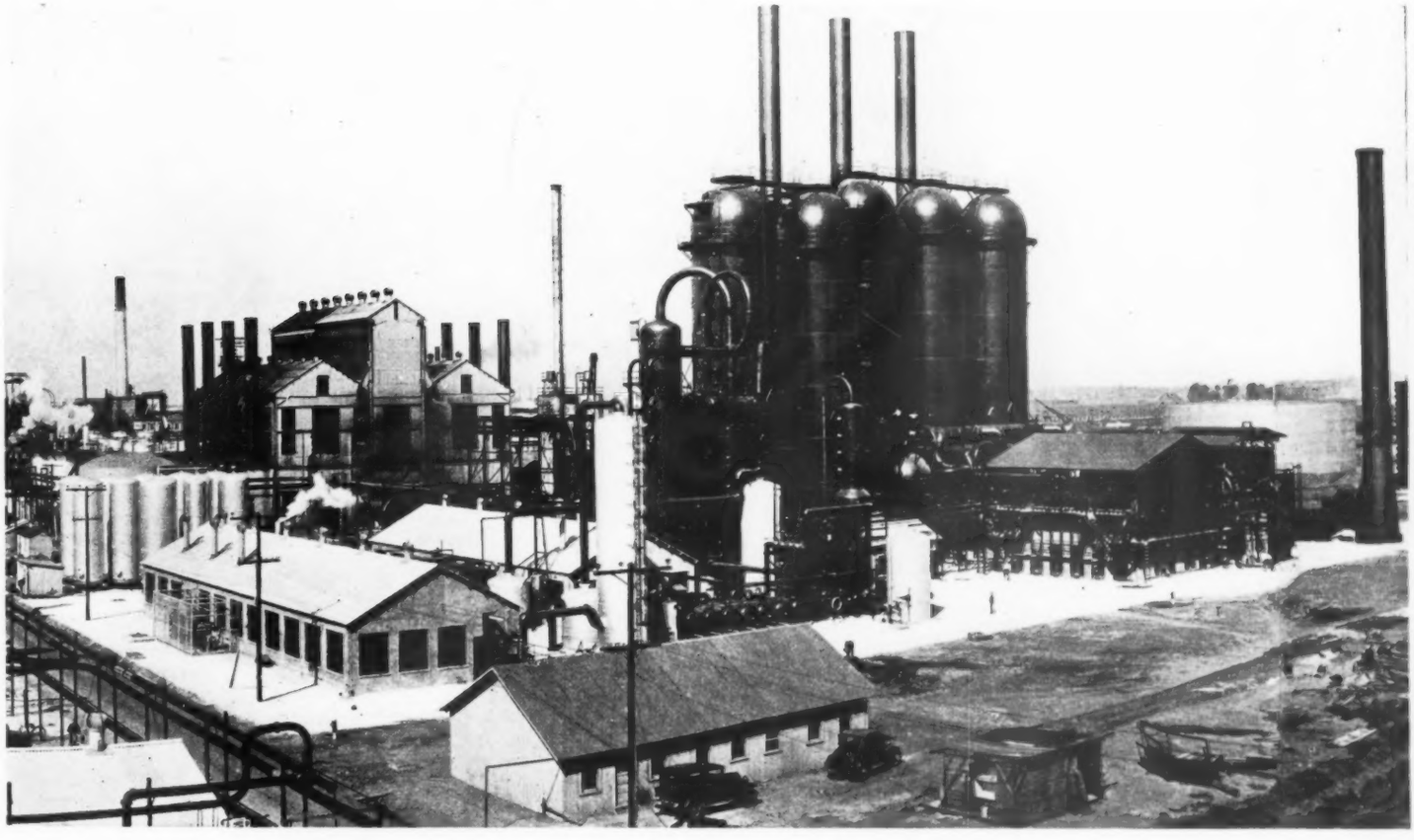
This condition is reflected in the low fuel consumption which will average about 10 percent of the fresh charge when the fresh charge is overhead distillate. The fuel consumption is lower for crudes and reduced crudes. The tubular heaters consume approximately 7½ percent and the stoves 2½ percent of the total fuel burned. Fuel consumption of 10 percent or less of the fresh charge is the lowest fuel consumption of any known vapor phase cracking process, and is comparable with any of the liquid phase processes.

The process operates on a time efficiency basis (time on stream) of 90 percent or higher. That is to say, the inoperative time spent in cleaning and making general repairs will average 10 percent or less.

The Wood River installation was originally designed to produce 2,000 bbl. of finished gasoline per day from gas oil charge. By reason of certain simple changes in the design and methods of operation, its capacity has been more than doubled, so that it is now producing close to 5,000 bbl. of 415 deg. E.P. finished gasoline per day. The output varies with the end-point selected, the raw charge used and other operating conditions. The highest output has been 7,315 bbl. of distillate per day.

The stoves have enormous heat-storing capacity and operate on a very high degree of efficiency. In the light of present

T.V.P. Unit in commercial operation at Wood River, Ill.



operations a T.V.P. unit may be built of any reasonable capacity, certainly with an input capacity in excess of 20,000 bbl. per day, if necessary for a single unit, although much smaller units are also economical.

In case a refinery requires a single large unit around which all the refinery operations can be centered the T.V.P. unit offers an ideal solution. With one cracking zone it can handle simultaneously or consecutively every available charging stock, large unit, such as that spoken of in the preceding paragraph, are decidedly less than costs of other systems. In the case of units of more usual size T.V.P. costs are less than other vapor phase cracking process and are strictly competitive with any liquid phase process.

The T.V.P. Process will handle any grade of charging stock, including reduced crudes, mazout, gas oil, kerosene or straight-run naphtha.

Properties of All Composite Samples Table II

	T.V.P. Unit			Lachman Unit		
	Raws Oil	Dist.	Res.	Gasoline	Bottoms Strip. Tower	Bottoms Treat. Tower
Gravity, deg. A.P.I.	37.4	48.2	15.3	50.3	28.4	13.1
A.S.T.M. Dist.						
IBP deg. F.	224	100	442	104	394	359
10 Percent Rec. @ deg. F.	362	171	500	168	416	416
20 Percent Rec. @ deg. F.	397	212	528	200	422	452
30 Percent Rec. @ deg. F.	424	244	546	230	426	486
40 Percent Rec. @ deg. F.	449	274	588	260	431	542
50 Percent Rec. @ deg. F.	474	301		290	438	590
60 Percent Rec. @ deg. F.	500	328		316	446	
70 Percent Rec. @ deg. F.	528	350		337	460	
80 Percent Rec. @ deg. F.	564	370		356	490	
90 Percent Rec. @ deg. F.		390		376	563	
E.P.		424		400		
Rec. Percent		97.5		98.0		
Res. Percent		1.0		1.0		
Loss Percent		1.5		1.0		
Percent Evap. @ 400 deg. F.	21.0	95.0			0.5	6.0
Percent Evap. @ 424 deg. F.	30.0					
Percent Evap. @ 437 deg. F.	35.5				48.5	16.0
Percent Evap. @ 450 deg. F.	40.5					
Percent Evap. @ 600 deg. F.	88.0		55.0		95.0	
Sulfur, percent wt.	0.66	0.26		0.091	0.40	
Aniline cloud deg. C		15.5		20.5		
Oct. No. CFR Motor		72.5		72.5		
Gum, g/100 cc						
Cu. Dish				0.012		
Glass dish, with air				.004		
Flash Pt., deg. F., o.c.			230		180	175
S.U. Vis. @ 100 deg. F. sec.			74		33	
B.S. & W., percent by vol.			0.2			
Bromine No.		81.0		77.0		
Induction period, hrs.				4		
Aromatics & Unsats. percent vol.		54.0		50.0		

T.V.P. Process Yields from Various Charging Stocks

Yields	Charging Stocks: S.R. Naphtha	Kerosene	Gas Oil	Reduced M.C. Crude
Gasoline, 410 deg. E.P. 73.5 Oct. MM (Percent)	85	80	67	58
Fuel Oil (Percent)	5	8	18	30
Gas (Percent)	10	12	15	12

Yields	Charging Stocks—Crude: Mid-Cont.	East Texas	Kettl. Hills	Signal Hill	Semi-nole	Van Zandt
Gasoline, 410 deg. E.P. 74 Oct. MM (Percent)	68	70	72	66	73	70
Fuel Oil (Percent)	23	21	20	25	19	22
Gas (Percent)	9	9	8	9	8	8

producing light straight-run gasoline, special straight or cracked naphtha cuts, kerosene, light or heavy gas oils of low pour points, low viscosity fuel oil, asphalt and high-grade gasoline in extremely high yields.

Construction and operating costs for a

In order to produce the maximum quantity of high anti-knock gasoline it is oftentimes desirable to reform the heavy straight-run naphtha. The T.V.P. Process produces unusually high yields from such an operation, as indicated in the table of yield figures given herewith.

Russian Refining Situation

(Continued from page 227)

L. Nersessoff has suggested the building of refineries of atmospheric vacuum type in two sections instead of one. The atmospheric section to be Badger type similar to the unit erected at Grozni for 4,000 bbl. per day and the vacuum section to be of Soviet design. All coke shells to be replaced by drums and sulphuric acid treatment to be replaced by Osterstrom method of clay treating. Part of the equipment would be imported from the United States.

A. Ackerman has suggested adoption of the practice followed in the United States in processing the crude with a view to obtaining 50 percent gasoline and eliminating kerosene completely. All equipment including compressors, pumps, motors and measuring instruments to be imported from abroad.

Neftproject plans are based on complete design and construction of all equipment by domestic shops.

While the accompanying table of costs and yields of the three plans gives an indication of their desirability, two other factors are likely to influence the Soviet industry and government in reaching its final policy in regard to refinery construction. The plan advanced by Neftproject providing for the construction of all equipment in domestic plants, as demonstrated in the foregoing article, is probably impossible of accomplishment. Ackerman's plan requires the establishment of such large credits outside of U.S.S.R. as to be very difficult of accomplishment. Nersessoff's plan, however, provides for both importation and domestic construction.

A Comparison of the Costs of the Three Refinery Construction Plans

	Neftproject	Nersessoff	Ackerman
Equipment (000,000 Rbl.)	65.1	57.6	81.6
Other capital costs (000,000 Rbl.)	176.0	162.6	161.0
Cost per ton crude (Rbl.)	48.2	44.0	48.5
Cost per ton products (Rbl.)	57.6	50.7	63.8
Cost per ton white products (Rbl.)	95.4	82.9	80.5
Fuel required (000 tons)	644.5	494.6	1017.0
Percent of fuel per ton of charge	12.9	9.9	20.9
Metal required for plant (000 tons)	97.3	96.2	100.6
Metal required for equipment (000 tons)	24.2	22.8	32.6
Yield of products (percent):			
Gasoline	22.6	25.4	50.8
Kerosene	20.6	20.6	...
Diesel	16.5	16.5	9.5
Coke	1.7	1.7	20.0
Asphalt	3.6	3.6	...
Fuel oil	25.5	25.9	...
Gas	3.0	3.0	16.6
Losses	3.4	3.3	3.1

No Decline in British Petroleum Trade

Anglo-Persian Concession Agreement Leaves Company Fair Profit for First Year. British Drilling in Germany Terminated. Russian Exports to England Except Lubricants Show Decline.

London: June.

RECENT talk of a set-back to British internal trade recovery finds little or no confirmation from conditions in the market for petroleum products. According to reports from leading distributors, consumption appears to have been well maintained at the higher level established during the past year, although competition from independent distributors in the motor spirit market continues. Reduction of the price in March tended to reduce the scope of the smaller unaffiliated concerns, but it has by no means eliminated the possibility of competition from this source. Figures published in WORLD PETROLEUM in June 1933 showed that on the basis of the then existing Gulf price of 2–2½ cents per American gallon for gasoline of 61/63 gravity, it was possible to lay down this product at Thames Haven at 2½d.–2¾d. per Imperial gallon, giving a total cost, including 8d. petrol tax, of 10½d.–10¾d. Based on a recent Gulf price of 4¾ cents, a similar calculation at the present time shows that 3¾d. per Imperial gallon would cover the import cost of motor spirit in this country, giving a total cost, including tax, of 11¾d. per gallon. Since the selling prices charged by the national distributing group (1s. 5d. per gallon for first grade spirit) is the same now as that ruling a year ago, the margin in favour of the independent has contracted during the past year by something like 1d. per gallon. It is, however, still large enough in view of the expense in which the national group and other responsible distributors are involved in providing the British public with constant supplies of consistently high-grade material. On the basis of the figures given, it seems that the small independent, who makes no attempt to provide service to the public, still has scope for profitable operations.

SEVERANCE of relations between the national petrol distributing companies and the Motor Trade Association is not likely to lead to any weakening of the British price structure. The difficulties which led to the resignation of the petrol distributors from the M. T. A. appear to have arisen entirely from a misunderstanding on the part of that body over the terms of a "stop list" arrangement with the distributors for bringing disciplinary action against retailers on price cutting and similar questions. Prior to 1932 the national petrol companies were operating a system for the maintenance of the price of petrol which had been evolved in cooperation with the M. T. A. In 1932 the system was altered by the M. T. A. without consultation with the petrol companies, with the result that for over a year the companies maintained the price of their products without the cooperation of the Association. At the urgent request of the Association, the petrol companies agreed in April last year to give the Association's new system a trial, with perfect freedom on their part to end it without affecting the question of their M. T. A. membership. The recent breach arose through the decision of the companies to exercise this right, the M. T. A. then holding that such action would involve resignation. The petrol companies thereupon resigned, but they have every confidence in their power to maintain their official retail prices.

All the circumstances of the case, including past experience, suggest that the petrol companies will be able to retain price control without M. T. A. assistance. Excellent supply services, extensive advertising, and the royalty rebate system are among the factors making for effective control by the companies on their own account. Moreover, the Motor Trade Association, the Petrol Retailers Association, and the M. T. A. itself, all regard the possibility of relaxation of control of petrol prices as a serious matter for their members, and all discountenance price cutting on the part of dealers as a result of the present rupture. All three bodies, to judge from the published statements emanating from their spokesmen, would not be sorry to see the present disagreement terminated. Although, as an indication of the prospects while the present position lasts, their attitude is important, the three Associations represent only a small proportion of the retail petrol trade of Great Britain. Even the P. R. A., which is devoted to the interests of the filling stations, has only 8,000 members, against a figure of 35,000 estimated by the petrol companies as the total number of petrol retailers in the country.

ANGLO-PERSIAN'S new concession, concluded last year with the Persian Government after the latter had annulled the former D'Arcy Concession, operated quite satisfactorily from the company's standpoint during the first year of its existence. The amount charged in the company's 1933 accounts for "royalty and taxation payable to the Persian Government" was £1,785,013, an increase of only £282,235 on the sum charged for the previous year. The new concession agreement provided, among its financial terms, for a royalty to the Persian Government of 4s. per ton on all petroleum products sold or exported, with a minimum annual payment of £750,000, plus a sum equal to 20 percent of all excess earnings of the company over £671,250. The last mentioned figure represents five percent on the existing ordinary capital. In addition to the above payments, a charge on output in lieu of taxes, with an annual minimum of £225,000, is paid by the company. The past year seems to have provided a fair example of the operation of the concession terms. Output was increased, and was thus above the production at the time the royalty provisions were agreed upon. Profits for the year were certainly much below those earned at some periods of the company's career, but on the basis of figures in the 1933 report a rise to the former profit level, through an increase of selling prices, should not involve a disproportionate increase in the payments to the Persian Government under the profit sharing clause.

Sir John Cadman, chairman of the board, announced at the annual meeting, that it had been decided to repay the debenture stock of $4,850,000. The chairman stated that after repayment the company would have adequate liquid resources for any requirements that could be foreseen.

A dividend of 7½ percent less tax amounting to £1,006,875 was declared and £310,944 was carried forward. Ac-

counts showed a profit of £2,643,978 after payment of taxes and royalty to the Persian Government and income tax.

Trinidad Leaseholds announced an interim dividend of five percent less Trinidad income tax and subject to United Kingdom tax, for the year ending June 30, 1934 to shareholders of record May 12.

AN INTERESTING sidelight on oil production in Germany was dealt with by Walter Maclachan, Chairman of the British-Borneo Petroleum Syndicate, Ltd. in his recent address to shareholders. This company joined forces with the Anglo-Persian Oil Company, Ltd. to drill on the Elm concession. Prior to drilling test wells, conditions indicated a possible oilfield of great importance. Traces of oil and gas were found in the later stages of drilling under thick beds of salt at 6,327 ft., but when the dolomitic limestone of the Middle Zechstein was reached the structural conditions were found unfavourable to oil in commercial quantities, as the limestone was non-porous and did not have sufficient thickness. The company's geologists decided that the whole area of the Elm concession was of similar character, and this was confirmed by a well drilled by the Mining Department of the State of Brunswick. So no further drilling will be done, and the concession has been abandoned.

DURING the second reading of the new petroleum bill in the House of Lords, Viscount Hailsham, Secretary of State for War, stated that if the search for oil in Great Britain was to be made a success—and the Government deliberately desired to do this from reasons of economic and defense interests—it was essential that the Government should attract those very few people who were mainly, though not entirely, British and who had sufficient skill and geological knowledge to decide the most likely places to drill for oil. The Marquis of Londonderry, Secretary of State for Air, stated that the Government intended to introduce an amendment to the bill calling for the publication of an official notice giving the name of the licensee and the concession granted immediately on the issuance of a license. From the House of Lords the Petroleum bill will go to the House of Commons for consideration.

IMPORTS during May were well maintained and featured large quantities shipped from the Dutch West Indies. Crude oil imports were lower in May compensating for the considerable increase in crude imports during April.

Increase in Russian Lubricating Oil Imports

Russia's decline as a factor in the British marketing situation, to which attention was directed in the January 1933 issue of WORLD PETROLEUM, has continued at a rate which suggests either a definite change of policy on the part of the Soviet authorities or a decline in the attractiveness of the British market. Probably both influences have been at work to reduce the turnover of Russian Oil Products. This retreat from the British market throws into greater relief the remarkable increase which is taking place in Russian shipments of lubricating oil to Britain. Official Russian export figures show that shipments of all petroleum products to this market fell from 4,662,045 bbl. in 1932 to 2,342,985 bbl. last year. The general decline of approximately 50 percent is all the more striking when it is recalled that 1932 showed a big contraction on 1931.

British Imports by Products From All Sources

(Barrels)

	May 1934.	Five months to May 31, 1934.	Five months to May 31, 1933.
Lamp oil	433,400	2,859,971	2,415,997
Motor spirit	3,940,485	13,032,657	13,044,277
Lubricating oil	269,800	1,257,200	1,101,068
Gas oil	268,042	1,611,185	1,450,619
Fuel oil	1,868,944	7,281,744	6,520,322
Other sorts	68,829	316,572	167,107
Total products	5,949,800	26,359,629	24,699,390
Crude	826,114	5,353,742	4,489,483
Total imports	6,775,914	31,713,371	29,188,873

British import statistics, summarised in the following table, reveal a further serious loss of ground in the British market for products other than lubricating oil since the beginning of the current year. For lubricating oil, the imports have nearly doubled against the January–April figure last year, and represent an increase of 270 percent on the figure for 1932.

British Imports of Russian Petroleum Products

Four months to April 30.

(Barrels)

	1932.	1933.	1934.
Lubricating oil	60,000	117,000	222,000
Lamp oil	738,000	212,000	77,000
Motor spirit	767,000	691,000	522,000
Gas oil	190,000	95,000	43,000
Fuel oil	327,000	81,000	23,000
	2,082,000	1,196,000	887,000

Although these figures do not include the American gasoline shipped to Britain on Russian account for blending purposes, they may be taken as an approximate index of the change in the activities of Russia in the British market. They are not affected by the temporary embargo on Russian imports imposed by the British Government last year, as this only came into force at the end of April. Declining shipments to Britain reflect a general fall in total Soviet oil exports, due partly to the necessity of meeting a greatly increased internal consumption. Nevertheless, the decline of nearly 26 percent shown in exports of all products to this country during the first four months of the current year must be due to something more than lack of supplies in Russia. In so far as it concerns Russia at all, the fall suggests a deliberate change of the direction of export business. Recent policy of the Soviets has evidently been to concentrate on the most remunerative and economical markets, and Scandinavia, Asia Minor and the Far East have probably been found more favourable than Britain as outlets for Russian oil.

Apart from the general decline in British selling prices for motor spirit and other petroleum products, there are good reasons why this market is now less attractive than formerly to the Soviet. The agreement whereby the leading companies operating in the British market absorbed large quantities of Russian oil lapsed in 1932. This contract, which included the Russian kerosene formerly cracked at the Medway Oil and Storage Company's refinery, was based on a price level highly favourable to the Russians. Last year saw the severance of all liaison between the national distributing companies and R. O. P., which evidently weakened the position of the latter very considerably. At the same time, the association of interests between the national companies and semi-independent concerns has tended to become closer, and competition by distributors unassociated with R. O. P. has consequently tightened. Contraction of R. O. P. activities must therefore be attributed largely to changes in the market here, although it may also be due in part to a change of export policy by the Soviet authorities.

Russia's future policy in Britain will doubtless be guided by circumstance, and there is no apparent reason why it should undergo a change as a result of the new trading agreement recently concluded between Britain and Russia. Meanwhile, the R. O. P. organisation, although relatively inactive, remains very much alive, and could be expanded without much difficulty in a relatively short time if the market position were considered to warrant a more active policy.

ALEC H. DAY

New Roumanian Drilling Increases

Export Price Trend Discouraging in Face of Increased Taxation, Application of Export Taxes and Competition of Iraq Oil. Government Attempting to Dispose of Royalties Collected in Kind.

DURING the first three months drilling in the Roumanian oil fields has been more active than usual, and production has somewhat increased. Compared with the corresponding period of 1933 the figures for production in the first quarter of 1934 are 17.8 percent greater. and the footage drilled is greater by 107 percent. The trend during the period in question may be seen by comparison with the figures of the preceding quarter, that is, October, November and December 1933.

Comparison of Production and New Drilling Last Quarter 1933 and First Quarter 1934

	Production		New Drilling	
	Tons	Index	Tons	Index
Fourth quarter 1933	1,934,869	100	77,031	100
First quarter 1934	1,974,464	102	91,585	119

During the first quarter of this year the new field Rasvad-Viforata, which is an extension of the very productive district Gura Conitzei, produced 105,255 tons, or 5.4 percent of the total production of the country.

The contributions of the principal companies to the total production are shown in the accompanying table, which gives their production for the first quarter of 1934.

During the first quarter of 1934 the refineries treated 1,850,525 tons, or 95 percent of the total production of crude oil. Domestic consumption absorbed 357,781 tons, or 21 percent of the products turned out by the refineries.

Exports During the First Quarter 1934

	Tons	Percent
Gasoline	410,624	30.9
Lamp oil	243,200	18.3
Gas oil	241,805	18.2
Mineral oils	9,415	0.7
Paraffin	1,864	0.1
Fuel oil	386,400	29.1
Asphalt	14,269	1.1
Crude petroleum	21,646	1.6
Total, 1st. quar. 1934	1,329,223	100.00
Total, 1st. quar. 1933	1,285,150	

The export prices have greatly diminished in comparison with prices prevailing at the beginning of the year. On February 1 of this year gasoline sold for 14.11 gold dollars per ton F.O.B. Constantza against 13.63 F.O.B. Gulf. On May 18, however, the price per ton at Constantza had dropped to 10.45 while the F.O.B. Gulf price was 10.52. Kerosene dropped between the same dates from 9.37 to 6.56 F.O.B. Constantza against Gulf prices which dropped from 8.59 to 7.99. Fuel oil F.O.B. Constantza was 3.89 gold dollars on February 1 and 3.40 May 18. The same product sold F.O.B. Gulf 3.84 gold dollars February 1 but had actually increased to 4.05 by May 18.

The tone is extremely weak, and the downward swing was still in course at the end of May. The approaching date on which Iraq oil will be available is casting a feeling of discouragement over the industry and there is pressure to sell. On the other hand the outlook for Gulf products is scarcely better.

The Roumanian oil industry is fighting an apparently losing battle against the swarm of new taxes raised by recent legislation permitting local governments to levy imports on oil. Practically every commune in which a refinery is located has availed itself of the privilege, and all four of the oil ports have joined the procession, with the result that local taxes on the industry now amount to more than 210,000,000 lei. The municipality of Constantza, the entire budget of which last year was 80,000,000 lei, has this year doubled its income by imposing a new export tax of its own, and other local taxing bodies are preparing to follow the example. This is decidedly discouraging in the face of falling prices, reduced dividends, and the prospect of increased competition with Iraq oil.

In view of the serious difficulties ahead of the export market the oil companies are at last seriously moving toward a "sanitation" of the domestic market in a way that will stabilize prices and do away with destructive competition. The domestic consumption is only about 20 percent of the total production, but what can be saved in the domestic trade will be that much to the good of the industry.

The matter of disposing of the Government's oil royalties, which the authorities have elected to collect in kind because the producers would not agree to a higher cash price, is still undecided. As these royalties amount to 10 percent of the total production, or about 2,300 tons a day, the government as an oil merchant becomes a factor of some importance. Efforts to sell the oil to French interests for cash fell through, and an effort is now being made to exchange the oil for munitions. In the meantime prices have fallen and the government's stock of oil is worth 10 percent less than it could have realized in April.

The oil industry has begun in earnest to fortify its position in foreign markets, something which it is now seen has been too much neglected in the past. Coincident with the decision of the "Redeventza" to establish a refinery in Belgium, a Belgo-Roumaine Chamber of Commerce has been organized in Antwerp to promote trade between the two countries.

The "Prahova" has acquired the entire assets of the "Petrolul Bucaresti." The "Prahova" thus becomes a complete producing, refining and marketing unit and in point of size takes rank as sixth among Roumanian oil companies.

Production and New Drilling for the First Quarter 1928–1934

	Production			New Drilling		
Year	Tons	Difference from previous year, percent	Percent of 1928 production	Meters	Difference from preceding year, percent	Percent of 1928 operations
1928	963,273	+78.6	100	61,700	+ 2.8	100
1929	1,094,706	+13.6	114	76,000	+ 23.1	123
1930	1,349,930	+23.3	140	72,000	— 5.3	117
1931	1,674,683	+24.1	174	35,000	— 51.4	57
1932	1,551,229	— 7.4	151	29,414	— 15.6	48
1933	1,675,121	+ 7.9	173	44,186	+ 50.2	72
1934	1,974,464	+17.8	205	91,585	+107.2	148

New Drilling and Production by Companies First Quarter 1934

	Production		New Wells	
	Tons	Percent	Tons	Percent
Astra Romana	409,411	21.02	16,188	17.68
Concordia	286,363	14.70	7,634	8.34
Steaua Romana	263,222	13.52	9,400	10.25
Romana-Americana	223,985	11.50	8,141	8.89
Groupe Unirea	198,517	10.19	17,381	18.99
Prahova	128,488	6.60	4,623	5.05
Creditul Minier	100,698	5.17	7,567	8.26
Other enterprises	336,780	17.30	20,631	22.52
Total	1,947,464	100.00	91,585	100.00

Port Jerome refinery of the Standard Franco-Americaine de Raffinage under construction; the plant was formally opened on June 5.

French Crude Imports Increase: Product Imports Decrease

OFFICIAL French figures for oil imports and exports indicate a rather striking trend in the French oil market, as may be seen from Table I, in which the statistics for the first four months of 1934 are compared with those of the corresponding period of 1933.

Table I.—Exports and Imports, Four Months, Figures in Metric Tons

	Imports		Exports	
	1934	1933	1934	1933
Crude oils	1,219,110	618,812	6	7
Gasolines	408,602	575,455	1,683	2,386
Lub. oils	52,722	62,018	18,781	1,052
Gas oils	124,568	135,361	18,834	7,693
Fuel oils	117,990	180,958	86,775	21,518
Road oils	12,353	18,348	14,411	5,081
Miscellaneous	25,501	49,439	8,082	6,970
	1,960,846	1,640,391	148,572	44,707

These figures show the importation of 320,455 more tons in the first four months of 1934 than in the corresponding period of 1933; most of this increase was in crudes for the use of the French refineries, and there was a corresponding decrease in the importation of finished products. Somewhat more surprising is the noteworthy increase of exports; these have risen from 44,707 tons in 1933 to 148,572 tons in 1934. About half of these exported products went to four countries: Spanish Morocco and Canary Islands, Great Britain, Italy and Cuba. The sources of the imported crudes remain about the same, with the United States, Venezuela, Persia, and the U. S. S. R. in the lead.

Even more suggestive are figures of estimated consumption and the movement of stocks through the oil depots, as shown in Table II.

Table II.—Consumption and Movement of Stocks in 1934, Four Months, Figures in Tons

	Consumption	Movement of Stocks	
		In	Out
Gasolines	782,401	555,612	636,024
Gas Oils	200,504	139,148	148,347
Fuel Oils	462,056	284,113	258,804
Lub. Oils	79,071	63,385	62,298
Road Oils	49,834	44,525	6,744
Miscellaneous	69,479	30,784	40,620
	1,643,345	1,077,567	1,152,937

The trend of consumption as indicated in Table II is unmistakable; the movement out of stock exceeded the movement in by about 74,500 tons, and this is evidently due to an increase in consumption which is naturally to be expected in view of the marked increase in imports.

The decrease in imports of finished products is undoubtedly a reflection of increased activity of the French refineries, of which there were nine at the end of 1933. The new refinery of the Societe Generale des Huiles de Petrole at l'Avera began operations in January, 1934; the new Standard Franco-Americaine de Raffinage (Jersey Standard) refinery at Port Jerome, which has a capacity for producing 10,200 bbl. gasoline daily, was formally inaugurated on June 5. A full description of this refinery which is the largest in Europe, may be found in the October, 1933, issue of WORLD PETROLEUM. When the three remaining new refineries on the present program are brought in, the volume of imports of finished products may be expected to show further decreases.

▼

Egyptian Production Decreasing

IN ORDER to find and develop some alternate supply of crude oil to the present Egyptian fields, the reserve fund of Anglo-Egyptian Oilfields, Ltd. has been increased by £50,000 to a total of £150,000. Production in Egypt has been slowly falling and tests have shown that no substantial extensions of the known structure can be expected. A further search will be made outside the limits of the Hurghada concession if the Egyptian government grant the necessary license. Production amounted to 1,591,530 bbl. in 1933 compared with 1,826,161 bbl. in 1932. The company's refinery on the Suez Canal last year treated 1,528,366 bbl. of Egyptian crude plus 626,262 bbl. of imported crude.

▼

TEST wells sunk by the Hungarian Government in the Matra and Bakk hills have encountered oil-bearing horizons. Test drilling in Trans-Danubia will begin in the Fall.

2.15 Miles Below Earth's Surface

World's Deepest Well at 11,377 ft. in South Belridge, California Field. Drilling Superintendent Says "Just a Regular Oil Field Job" in Transcontinental Telephone Interview.

WHEN General Petroleum Corporation started drilling its now famous Berry No. 1 in the San Joaquin Valley, California, it was not with the expectation of sinking the deepest well in the world. The purpose was an exploratory test of the sand measures underlying the Middle Miocene brown shale horizon of the South Belridge field, equivalent to the Belridge sand zone of the North Belridge field and the Kettleman sand measures of the Kettleman North Dome field, commonly referred to as Miocene Temblor strata.

Owing to the thickening in shale members of the Upper and Middle Miocene in this locality and the fact that sands were not found to be present in the shales, correlating with the position of the sands in the North Belridge field, it was found necessary to go much deeper than had been anticipated to reach the underlying sands.

The well was spudded in on September 20, 1930, and was drilled by easy stages and without any occurrences that could be regarded as exceptional in sinking a well in this territory to a depth of 8,261 ft. which was reached on March 16, 1932. Extremely hard formation was encountered at about 7,000 ft., slowing down progress to as little as a foot a day and using up bits at a rapid rate. This formation had not been completely penetrated in the middle of March 1932 when work was suspended in accordance with a general curtailment of field operations on the part of the company.

The hole remained undisturbed until August 11, 1933, when operations were resumed. After passing the 9,000 ft. level in January last progress was more rapid. The Carneros sand zone was encountered in coring at a depth of 11,200 ft. The drill then was further down than it ever had penetrated in previous oil field exploration, but it continued to penetrate the sand until May 29, 1934, when it came to rest at 11,377 ft. making Berry No. 1 the oil industry's deepest hole by a substantial margin.

Dick Shinn, drilling superintendent in charge of Berry No. 1, now at 11,377 ft.

Coring of the sand close to the bottom of the hole showed that the sand itself was hard, compact and fine to medium grained. All sands gave a good cut with ether and a considerable showing of gas and oil was evidenced in the mud in the circulating ditch, particularly when returns were first secured from the bottom after running in with the drill pipe. These showings were dissipated as circulation continued due to the heavy weight of the mud fluid. After the 6⅝ in. casing was landed and cemented and during the final stages of drilling the weight of the mud fluid was held within the ranges of 104 to 112 lbs. per cubic foot in order to combat the high gas pressure encountered.

When the Christmas Tree was set the hole stood full of heavy mud yet registered 1,700 lbs. gas pressure at the casing head.

To determine whether the company owned an oil well or merely the deepest hole in the world bailing was resorted to and continued to about 7,000 ft. without result. Swabbing followed and on the theory that the hole probably was bridged over the company at the time these lines were written contemplated the running of tubing to circulate the hole. By the time these notes appear in print the definite results of the time and labor spent during the past three and a half years probably will be definitely known. Whatever these may be Berry No. 1 will have the distinction of having carried the drill 2.15 miles below the earth's surface, a deeper penetration than ever before has been obtained in man's struggle for new sources of petroleum.

Aside from its record depth the outstanding feature about the sinking of the Berry No. 1 is that it was just a regular oil field job, accomplished with regular tools accepted in the industry as being of well established quality and by the use of standard methods. No serious trouble marred the progress of the work. There were no twist offs of drill pipe and only three fishing jobs of consequence during the entire operation. The drill pipe was stuck seven times but was successfully freed each time without resort to fishing.

The fact that the work was carried on without accident or serious difficulty does not mean that it did not present plenty of problems. Full credit is given by officials of the company to the masterly way in which the job was handled by Dick Shinn, drilling superintendent, and his able crew and to W. L. McLaine, field manager, who had general supervision of the work. Shinn is a veteran of drilling work and has directed the sinking of many wells in California, Mexico and the Mid-Continent. Over the long distance telephone Dick Shinn told WORLD PETROLEUM that he attrib-

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Berry No. 1, South Belridge, California, the world's deepest well

uted the avoidance of serious trouble in the drilling of the world's deepest well to the fact that "we took things easy and tried to find out what needed to be done before rushing in to do it." He also gave credit to that share of good luck which every driller needs in every undertaking of this sort.

The company's statement in connection with the matter is that "while the problems connected with the project were at all times given careful consideration by the management and technical staff, the real credit for the successful completion of the well, at an unusual depth, should go directly to the drilling crew and to the superintendent in direct charge. Each driller, and every member of their respective crews, is deserving of individual credit for their splendid cooperation and their careful and intelligent workmanship."

In drilling the well, twenty-seven inch hole was drilled from the surface to 728 ft., eighteen and three-quarter inch hole from 728 ft. to 4,534 ft., twelve inch hole from 4,534 ft. to 7,761 ft., seven and three-quarter inch hole from 7,761 to 9,972 ft., and five and five-eighths inch hole from 9,972 to 11,377 ft.

All drill pipe used in conduct of this operation was of A.P.I. standard size and weights. Flush joint drill pipe was used on the bottom of the three inch drill string in drilling ahead after the six and five-eighths casing was landed and cemented. Six inch drill pipe was used in drilling from the surface to a depth of 4,534 ft., five inch drill pipe from 4,534 to 7,761 ft., four inch drill pipe from 7,761 ft. to 9,972 ft., and three inch drill pipe from 9,972 ft. to 11,377 ft.

The casing record of the hole is given in the accompanying table.

The casing used was all of A.P.I. standard specifications; the 13⅜ in. and 8⅝ in. casing being all grade "C," while the 6⅝ and 4¾ in. strings were mixed, partly grade "C" and partly grade "D." The drilled hole was thoroughly conditioned before running each string of casing, and as a result, no difficulty was experienced in landing and cementing the several strings of casing at the objective depths. Flush joint casing was used on the bottom of both the 6⅝ and 4¾ in. strings.

On account of the hazards connected with the running of the exceptionally long string of 4¾ in. casing needed to case the hole from the surface to the depth of 11,377 ft., this string was run in two sections. The first section, or liner, consisting of 1,754 ft. of flush joint casing with a specially designed combination adapter and left hand joint at the top, was run in on drill pipe. This was successfully landed on bottom and the drill pipe backed off at the left hand joint. The balance of the 4¾ in. casing was then run in to a depth of 9,616 ft.; this portion of the 4¾ in. casing, which will serve as a flow string, was held approximately seven feet off the top of the liner. The break of seven feet between the top of the liner and the 4¾ inch flow string provides space for any expansion of the casing due to high temperature at depth, and also a means for circulation, to assist in bringing in the well or to kill the well should any emergency arise which would necessitate such a step.

Drilling progress varied greatly during the course of the operation, from in excess of 100 ft. per day in the upper hole to as little as one foot per day at intervals between 7,000 ft. and 9,000 ft. where the formation was found to be extremely hard. The job was done by ordinary rock bits of well-known makes. In one stretch of 400 ft. two hundred and sixty bits were required, one making only nine inches. Diamonds were tried in this section of the work but without important improvement in progress. Strange as it may seem drilling progress was even greater in the last 1,000 ft. of hole drilled than at some intermediate depths.

In order to provide ample working space in the sub-structure, the derrick floor was built at a height of ten feet above the ground and supported by heavy concrete piers and steel girders which bridge the cellar, leaving the latter unobstructed by posts. The cellar is thirteen feet square by eight and one-half feet deep, and is reached by a stairway of gentle slope. Blow-out preventers and control valves necessary for protection in cases of emergency during the drilling operation were installed in the cellar where they were easily accessible. Careful control of the mud weight, however, obviated the use of this equipment.

The derrick was A.P.I. standard 122 ft., steel construction, with normal reinforcing, and had more than adequate strength for all loads imposed upon it.

Electric power was used, two 25/65-h.p. motors driving the drawworks and table through a differential gear drive. Forced ventilation furnished by auxiliary motors and blowers was provided. A 100-h.p. 4-cylinder gas engine was maintained on the standard end for emergency

Casing Record Berry No. 1

Casing	Weight		Depth	Date
20 inch	106 lb.	cemented	728 feet	September 29, 1930
13⅜ inch	61 lb.	"	4534 "	May 22, 1931
8⅝ inch	36 lb.	"	7752 "	January 4, 1934
6⅝ inch	26 lb.	"	9717 "	January 18, 1934
1754 feet of 4¾ inch liner	16 lb.	landed at	11,377 feet	May 31, 1934

Top of 4¾ inch liner 9623 feet, perforated from 10,376 to 10,705 feet and from 11,194 feet to 11,377 feet.

4¾ inch flow string 16 lb. suspended to 9616 feet June 1, 1934

use in case of power failure but was not needed for this purpose and was used only for incidental work such as tonging pipe and spooling line. The total electric power cost of the well was less than $40,000.

A 3-shaft 4-speed drawworks of design now several years old was used and proved satisfactory. Both blocks carried five sheaves, and 10-part reeving of the line was used during the latter part of the job. The crown block was of double deck construction.

A 9-in. spring hook was used most of the time but a special connector was used in its place for some of the heavy work. Automatic slip type elevators and spiders were used for handling the casing. A 125-ton swivel, the design of which is now several years old, proved satisfactory.

Geared mud pumps, 6¾ x 14 in., were used and were driven by 25/65 h.p. motors with forced ventilation. Two of these pumps were in the original installation, another was added as a sump pump, and another similar one with a 3,000-lb. fluid end was added later to meet the higher pressures encountered.

A rotary table of design now several years old proved satisfactory. A roller type kelley bushing was used to provide more sensitive control of weight on bit.

During the latter part of the job, a hydraulic brake was installed to supplement the compound lever friction brakes, and a tremendous economy in the use of brake lining was effected.

A vibrating screen was used throughout the drilling of the well and was undoubtedly a tremendous help in minimizing stuck drill pipe, obviating replacement of mud, and reducing wear on pump parts.

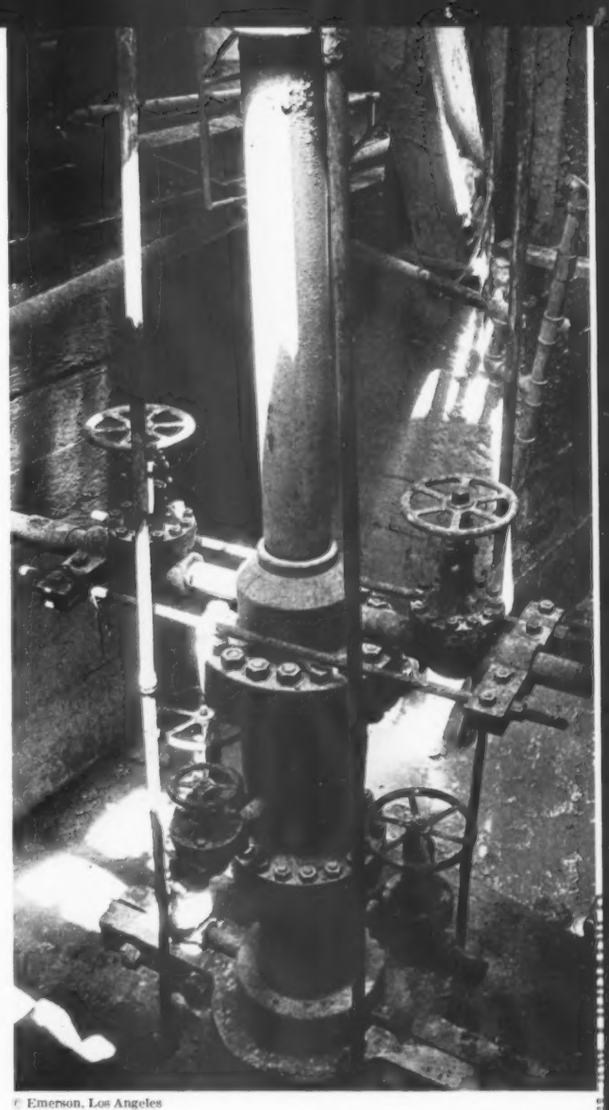
Customary rubber pistons proved fairly satisfactory but steel valves were found advantageous as pressure increased. Rubber hose proved satisfactory for even the higher pressures encountered, although a steel hose was kept in reserve for combatting possible blow-outs.

Careful control of weight on bottom is credited not only with maintaining a straight hole but with avoiding twist-offs and other mechanical trouble. This control of weight was, of course, ultimately up to the superintendent and drillers but their work was facilitated by the differential weight control and the customary weight indicator and recorder.

A recording tachometer of the electrical type was connected to the rotary table in an attempt to determine what speed of rotation gave the best drilling progress in the exceedingly hard formation and while it has not led to any general conclusions its continued use should be a guide to intelligent drilling of future wells. A recording voltmeter gave a record of whether the power had been off and whether the voltage had been maintained at a satisfactory value. Indicating and recording wattmeters on the drawworks motors and pump motors indicated to the drillers the torque which was imposed on the drill pipe and whether the motors were overloaded. A mud pump relief valve of special design was used and an electric cutout was provided for automatically shutting off the motors if critical pressures were exceeded.

Special apparatus was provided for measuring not only the weight but the consistency, sediment content, and settling rate of the mud used. This careful measurement and control of the mud properties, assisted by the vibrating screen, is considered one of the principal factors in the success of the job.

Casing lines of different makes, grades, and types were used. Grade "J" line was found satisfactory. The size was one inch and by reeving enough parts (maximum ten) and floating the casing strings in, it was never loaded to the danger point. Steel-center lines gave better service than hemp-center lines when loads were heavy, probably because they retained their diameter better.



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Cellar valve connections on the world's deepest well in South Belridge, California

Christmas tree hook-up on Berry No. 1

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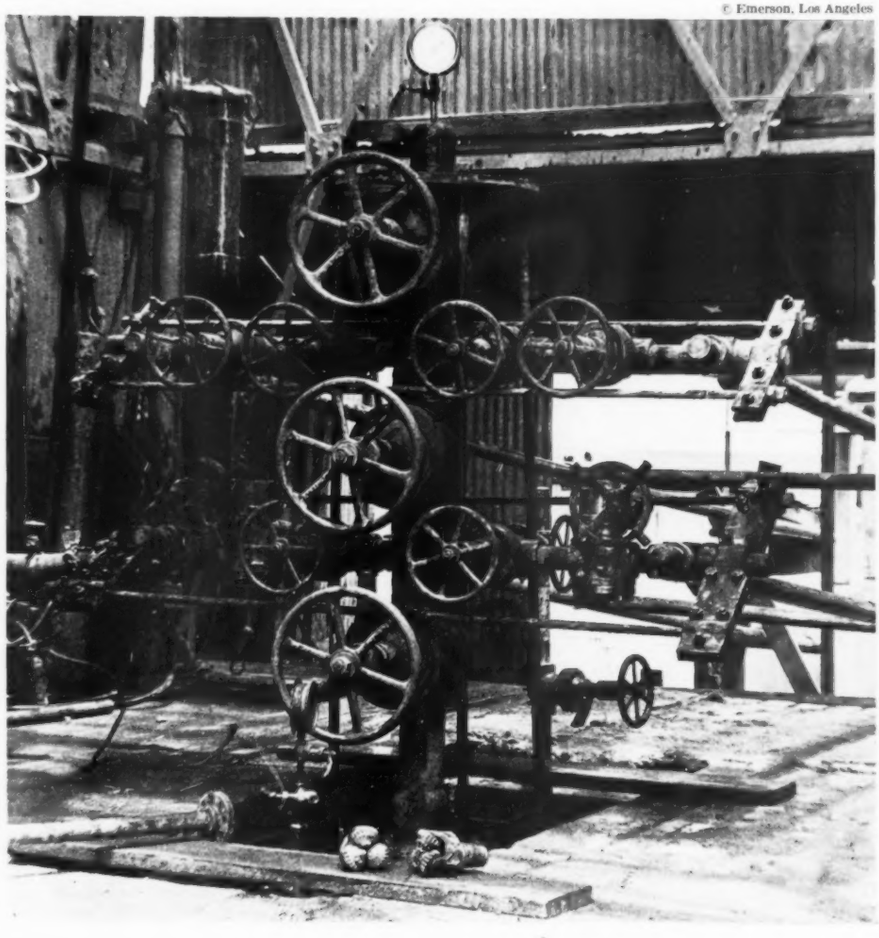

Foreign Oil Legion

William R. Boyd, Jr., vice-president, American Petroleum Institute, received

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Wm. Boyd, Jr., Ltd.

a degree of Doctor of Laws from St. Bonaventure College on June 12. Mr. Boyd also attended the dedication of a new Hall of Arts.

Gordon Michler

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Gordon H. Michler sailed from France on June 2nd by the Aquitania for New York where he will take up a new executive position with the Standard Oil Co. of New Jersey.

On leaving his University, Mr. Michler served in the Mexican campaign of 1916 and 1917 as an Artillery Officer in the United States army. In early 1918 he landed in France with the American Expeditionary Force and took part in several engagements. After the signing of the Armistice he remained with the Army of Occupation and was aide-de-camp to the General commanding the 4th Division.

Mr. Michler joined the Standard Oil Co. of New Jersey on his return to the United States, and, before eventually leaving for France he was manager of the Fuel Oil Department.

For the past four years, Mr. Michler has been Managing-Director of Societe L'Economique and vice-president of the Standard Franco-Americaine de Raffinage.

During the past year Mr. Michler was made a Chevalier of the Legion of Honour by the French Government.

Kenneth M. Leach of the Audley Engineering Company, Ltd., Newport, Shropshire, England, who has been in the United States for the past three months visiting the factories of the Merco Nordstrom Valve Company and the Pittsburgh Equitable Meter Company, was recently joined by his father, Mr. R. W. Leach, Chairman of the Board of Audley.

W. D. Crampton, who for some years past has been in charge of lubricating oil affairs of the Standard Franco-Americaine in Paris, and also a member of the management committee, has been appointed managing-director.

Sr. D. Demetrio Carceller Segura, director general, Sr. D. Luis de la Pena y Brana, vice-president, Sr. D. Ricardo Goizueta Diaz and Sr. D. Francisco Recasens Mercade, directors of the Com-

R. W. and K. M. Leach

pania Espanola de Petroleo S. A. (CEPSA) with Sr. D. Dupuy de L'ome, geologist and Sr. J. M. G. Careaga, superintendent of production in Venezuela for CEPSA have been visiting the United States during June. These gentlemen inspected the oil fields of Texas and Oklahoma, studying American drilling methods and equipment, visited the Chicago World's Fair and are returning to Madrid and Venezuela at the end of June. CEPSA controls refineries and production and supplies CAMPSA (Spanish Oil Monopoly) with petroleum and products for distribution in Spain.

Sr. D. Demetrio Carceller Segura

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AN INTERNATIONAL OIL MAN by Sir Henri Deterding as told to Stanley Naylor (Harper and Brothers: $2.00) is the partial autobiography of one of the outstanding personalities in the international oil world. Sir Henri introduces the subject by remarking that what he is doing is actually to take stock of himself. Naturally the book is of very considerable interest to oil men everywhere. Facts about the growth of the Royal Dutch Group, Sir Henri's contacts with the Standard Oil Companies, his early experiences in the Far East all contribute to make excellent reading. The material is presented in an informal, intimate manner. It is, however, unfortunate that this book only skims the surface of a career that is of sufficient interest and contains such varied and numerous elements as to require a much more exhaustive volume. Until such a book is published the present small volume will be of interest not only to those in the petroleum industry but to the general reader as well.

LE PETROLE ET LA DOUANE par E. Guichard is a carefully compiled review of the laws and taxation relating to the petroleum industry in France. In evolving a permanent petroleum policy the French government has enacted and debated a vast number of laws, regulations, parliamentary resolutions and other forms of government restriction or encouragement to the industry. The present work attempts to classify this material in such a manner as to make the regulations readily available to members of the French petroleum industry as a guide in their contacts with the government. The book covers, in as simple form as the nature of the subject will allow, a review of the general legislation relating to petroleum; the application of such legislation in specific cases; tariffs and taxes applying to each petroleum product, and finally various tariffs and taxes that apply to petroleum products from the time that they enter the country until they are finally consumed. In an effort to simplify the work, general tariff policies have been considered only as they affect petroleum and products. The volume is printed with unusually wide margins to allow notations to be made as taxes and regulations are changed, or further interpretations become available and should prove a most useful work to those interested in the importation, manufacture, production or distribution of petroleum and products in France.

THE ACCOUNTS OF AN OIL COMPANY by H. G. Humphreys, published by the American Institute Publishing Co., New York—$2.00, reviews the elements that enter into the accounting necessary for modern oil companies. After a brief introduction in which Mr. Humphreys discusses some of the factors that complicate oil company accounting and suggests various solutions looking toward simplification which have been made from time to time, the author enters into a discussion of the general accounts of oil companies, the evaluation of properties, the bookkeeping problems of the various departments and such special subjects as forecast of income. So complicated has modern accounting become, especially in the case of companies as large as some of the oil companies, that the services of public accountants, particularly where the public accountant has no special familiarity with the industry of his client, have no particular value except for the name and reputation of the accountant. Mr. Humphreys points out that the emphasis in accounting has changed from auditing accounts to auditing the entire business. The book contains two appendices on the code of fair competition and unit leases.

OIL AND PETROLEUM YEAR BOOK 1934 compiled by Walter E. Skinner, published in London (7s 6d) has just been issued.

Covering 458 pages the book contains particulars of 673 English and foreign companies—producers, refiners, dealers, transporters and oil finance companies, including the principal American and foreign companies. Lists are also given of the officials connected with the companies and comprise 2,586 directors, 342 secretaries and 202 consulting engineers, managers, agents, etc., their names and addresses and company connections.

The particulars of each company include the directors and other officials, date established, location of property or description of business, purchase consideration, oil production, capacity of refineries, capital, dividends and financial position as disclosed by latest accounts.

Other useful features of the book are the statistical tables showing the world's production of crude petroleum for the nine years ended December 1933, the monthly production for thirteen months ended April 30, 1934, of the principal British oil companies, list of 574 trade names of petroleum products marketed by the various companies and a glossary of nearly 500 technical terms and words peculiar to the oil industry.

THE LOMBARD SHIPPING AND TRANSPORT CODE for the requirements of the oil trade has been examined and we have come to the conclusion that because of its comprehensiveness and economy it can be thoroughly recommended, as well as for tanker chartering and shipping generally, also, as far as we are aware, this is the only public code which adequately caters for the oil man. The range of technical oil expressions, references to bunkers, vessels, ports, names of firms, and dates, should be more than adequate. Information from an unbiased source indicates that the economy of this code over other well known public codes ranges upward from 25 percent.

The LOMBARD SHIPPING AND TRANSPORT CODE is the second of a series of three which is being issued by Code Services Limited, the first being the well known Lombard General Code, and we are given to understand that the third (in course of preparation) will cover all the cabling needs of the Banking and Financial world. Copies of these codes may be ordered through WORLD PETROLEUM, price £10. each. Postage extra. Weight 10 lbs.

THE CHEMICAL FORMULARY, for 1933-34, published 1934 by Chemical Formulary Co., Brooklyn; 595 pages.

This unique book, compiled by a staff of 40 specialists in chemistry and engineering under the editorship of H. Bennett, is a collection of recipes for making thousands of products in all branches of industry.

THE Persian government has reasserted its claim to the Bahrein archipelago, where the Standard Oil of Calif. is developing a valuable oil property. The Persian contention further is that the Americans have no right to exploit this field, since their concession has not been countersigned nor approved at Teheran. The contention of the Americans and of the original British concessionaires is that the Bahrein islands are an independent Caliphate ruled by Sheik Hamad Binisa.

World Oil Production—Official Figures for 1934 Revised

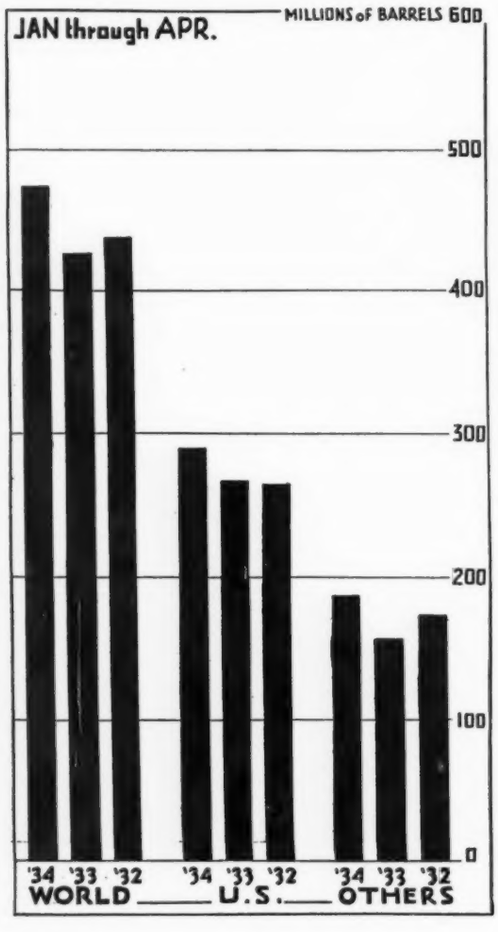
All figures furnished direct to WORLD PETROLEUM by Governments, except where otherwise specified

(Figures in U. S. Barrels—Conversion ratio 7 bbl.=1 ton)

Country	May 1933	June 1933	July 1933	August 1933	September 1933	October 1933	November 1933	December 1933	January 1934	February 1934	March 1934	April 1934
United States	84,747,000	82,841,000	84,387,000	85,239,000	78,186,000	76,017,000	69,755,000	72,060,000	71,976,000	65,450,000	75,548,000	75,796,000
Russia	12,794,600	12,489,400	11,837,000	13,402,200	14,340,200	14,595,000	13,479,200	12,591,600	13,356,000	12,488,900	14,644,000	14,081,900
Venezuela	9,380,893	9,354,387	10,197,425	10,367,511	10,231,410	10,852,653	10,843,910	11,253,704	11,091,514	9,921,765	11,238,717	11,185,076
Roumania	4,104,919	4,490,220	4,755,600	4,562,551	4,420,486	4,502,127	4,000,000	4,515,000	4,906,000	4,440,000	5,066,000	4,795,000
Persia[2]	4,370,835	4,452,000	4,648,000	4,669,000	4,109,000	4,549,867	4,199,797	4,422,096	4,164,790	3,988,502	4,483,535	4,284,231
Mexico	2,857,620	2,805,353	2,950,803	2,893,211	2,605,840	2,429,072	2,833,630	3,259,258	3,113,707	2,863,088	3,183,923	3,206,490
Netherland India	3,357,214	3,280,382	3,249,428	3,172,568	3,186,435	3,179,043	3,127,047	3,414,754	3,376,674	3,185,091	3,631,726	3,489,024
Colombia	1,169,238	1,113,328	1,189,655[1]	1,164,104[1]	1,085,885[1]	1,087,397[1]	999,253[1]	995,605[1]	1,012,780[1]	903,471[1]	1,017,147[1]	1,193,736[1]
Argentina	1,210,300	1,181,500	1,180,000[1]	1,180,000[1]	1,180,000[1]	1,180,000[1]	1,180,000[1]	1,180,000[1]	1,180,000[1]	1,180,000[1]	1,180,000[1]	1,180,000[1]
Peru	1,807,565	1,750,206	1,183,527	1,284,726	1,035,338[1]	970,427[1]	998,066[1]	1,178,004[1]	1,188,540[1]	1,041,658[1]	1,086,827[1]	1,037,127[1]
Trinidad	816,080	772,626	759,076	780,929	755,676	818,184	788,970	799,484	852,189	766,254	876,544	876,950
British India	729,669	741,244	799,726	754,633	773,404	680,832	667,648	701,392	700,000[1]	700,000[1]	700,000[1]	700,000[1]
Poland	326,900	326,830	336,553	332,934	315,000	312,956	309,624	311,500	213,333	281,946	310,800	304,500
Sarawak	302,385	184,250	196,756	194,327	182,602	186,431	179,648	176,008	172,172	158,361	176,568	171,000[1]
Japan and Taiwan[3]	195,000	195,000	195,000	195,000	195,000	195,000	195,000	195,000	195,000	195,000	195,000	195,000
Egypt	138,348	137,620	136,752	143,836	133,903	125,786	128,450	127,421	122,934	109,900[1]	121,121	117,236
Ecuador	128,226	141,640	147,889	148,467	139,826	141,379	133,591	138,198	132,635	120,900	131,566	135,226
Canada	89,754	113,447	99,510	100,602	97,342	97,132	108,304	113,677	124,425	116,546	130,046	118,890
Germany[3]	134,666	130,200	141,414	153,174	155,778	160,951	157,808	155,491	152,292	138,593	140,000[1]	176,071
Iraq[1]	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
France[1]	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000
Others[1]	35,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000
Total	128,744,212	126,682,633	128,573,114	130,920,773	123,311,125	122,263,237	114,266,946	117,770,192	118,312,005	108,231,975	124,043,520	123,225,457

[1] Estimate. [2] Anglo-Persian Oil Co. figures revised; fuel oil returned to the ground has been deducted. [3] Thuringia estimated 7,000 bbl.; official figure for Prussia. Sakhalin Russian included with Russia. Sakhalin Japanese included with Japan. [4] International Petroleum Company's figures.

Comparison of crude oil production in the United States, all other countries and total for the world during January through April, 1932, 1933 and 1934.



Official Crude Oil Production Figures for 1932, 1933 and First 4 months of 1934

(Barrels of 42 U. S. Gals.)

	Total 1932	Daily Average 1932	Total 1933	Daily Average 1933	Total 1934	Daily Average 1934
United States	785,159,000	2,145,243	898,874,000	2,462,670	288,770,000	2,406,416
Russia	149,719,000	409,070	148,901,900	407,950	54,570,800	454,756
Venezuela	119,596,512	326,766	120,882,802	331,186	43,437,072	211,142
Roumania	50,491,205	137,954	50,971,200	139,647	19,207,000	160,058
Persia	45,122,455	123,285	49,581,280	135,840	16,921,058	141,009
Mexico	32,802,285	89,624	33,904,882	92,390	12,367,208	103,060
Netherland India	39,584,027	108,153	38,512,663	105,516	13,989,024	116,575
Colombia	16,384,956	44,768	13,157,127	36,047	4,127,134	34,309
Argentina	13,166,900	35,975	13,954,800	38,232	4,720,000	39,333
Peru	9,899,266	26,026	13,923,281	38,146	4,354,152	36,284
Trinidad	10,023,780	27,387	9,560,039	26,192	3,371,937	28,099
British India	8,600,312	23,500	8,721,064	23,893	2,800,000	23,333
Poland	3,905,230	10,670	3,858,085	10,570	1,209,579	10,079
Sarawak	2,274,043	6,213	2,289,472	6,273	507,101	4,225
Japan and Taiwan	2,340,000	6,393	2,340,000	6,411	780,000	6,500
Egypt	1,742,370	4,760	1,591,495	4,360	471,191	3,926
Ecuador	1,573,857	4,300	1,622,624	4,446	520,347	4,336
Canada	1,054,373	2,880	1,147,825	3,144	489,907	4,082
Germany	1,824,019	4,983	1,712,823	4,692	606,956	4,057
Iraq	1,200,000	3,300	1,200,000	3,288	400,000	3,333
France	552,000	1,508	552,000	1,515	184,000	1,536
Others	432,000	1,180	432,000	1,184	144,000	1,200
Total	1,297,477,590	3,544,940	1,417,469,635	3,884,020	474,119,466	3,950,890

UNITED STATES

	Daily Crude Oil Production Bbl.	Daily Runs to Stills Bbl.	Total Motor Fuel Stocks Bbl.	Imports for week Bbl.	California Shipment East for week Bbl.
Week Ending May 26	2,526,500 510,500*	2,550,000	66,220,000	860,000	472,000
Week Ending June 2	2,491,500 523,500*	2,270,000	64,477,000	924,000	665,000
Week Ending June 9	2,646,500 572,500*	2,450,000	64,061,000	1,109,000	381,000
Week Ending June 16	2,661,550 555,000	2,535,000	63,688,000	873,000	578,000

Underlined figures indicate improvement in statistical position—decrease in production, runs to stills, gasoline stocks and imports.
* Estimated total production of the Rusk-Gregg field, East Texas; official and unreported.

Control Bill Defeated

THE HOUSE Interstate and Foreign Commerce Committee voted 12 to 5 on June 14 to table the Thomas-Disney Oil Control Bill sponsored by the Administration, and decided to conduct a wide survey of the oil industry during the recess period, reporting back recommendations to be enacted at the next session.

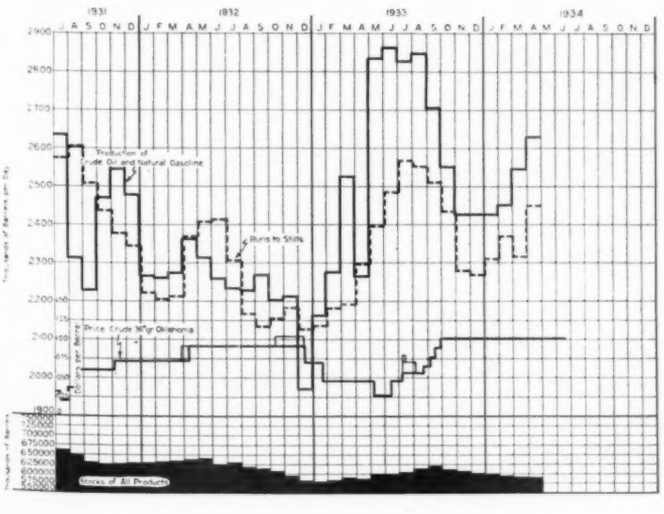
The passage of the oil control bill was delayed until the next session of the Congress despite vigorous efforts by Secretary of the Interior Ickes and the approval of President Roosevelt who on May 22 wrote to Senator Logan and Representative Rayburn, chairmen, respectively, of the Senate Committee on Mines and Mining, which approved the bill on May 24, and of the House Committee on Interstate and Foreign Commerce, which rejected the bill. President Roosevelt stated in part: "I am frankly fearful that if the law is not strengthened, illegal production will continue and grow in volume and result in a collapse of the whole structure. This will mean a return to the wretched conditions which existed in the spring of 1933. I hope therefore that the proposed legislation can be enacted. I do not want to see this important American industry reduced to the condition under which it was operated before the oil administration started its work." Secretary Ickes was greatly disappointed in the failure of enactment of the oil control bill declaring that a "very dangerous situation is created . . . we do not get the cooperation we should from many state officials . . . here is a bill that had the support of 95 percent of the oil industry, and is for the benefit of the country; and it cannot pass Congress."

The Oil Control Bill was rejected at this time by Congress partly as a natural consequence of the current tendency in the United States away from the strict governmental control, as indicated in the preceding issue of WORLD PETROLEUM, and as further substantiated by the new policy of the NRA administration, announced on June 8, declaring elimination of the price fixing provisions, direct or indirect. The declaration was, however, qualified on June 9 by a statement of General Hugh S. Johnson, who indicated that "it should be clearly understood that all of the provisions of approved codes, including their price provisions, are in full force and must be complied with . . . until the adjustments have been worked out in negotiations with the interested code authorities." Another important factor against the passage of the bill was its effect on the political situation in the state of Texas. Texas congressmen coming up for reelection this fall wished to avoid being placed definitely on record by a vote on production restriction.

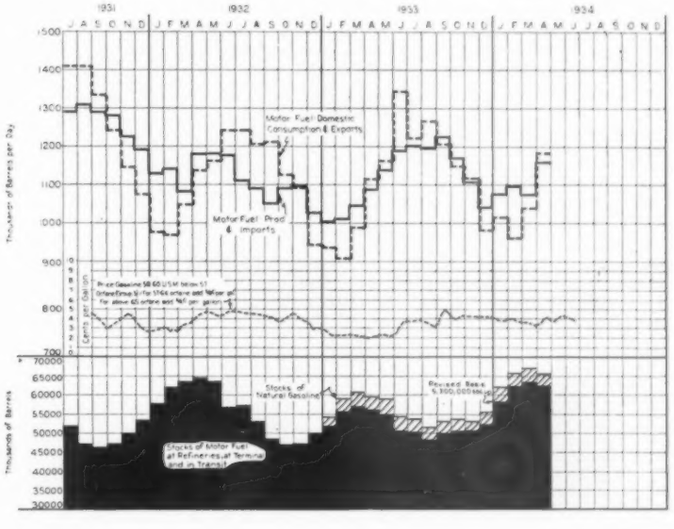
It is inevitable, however, that some kind of strict federal oil legislation is forthcoming in the next session of Congress if crude is again overproduced in large volume, with attendant break in prices, inasmuch as it is being now generally realized that conservation of the crude oil reserve in the United States is even more important than merely maintaining the price structure.

On the whole, however, the situation in the producing end of the industry is far from being hopeless. The Secretary of Interior still has sufficient powers under the Petroleum Code to exercise control over production, while the various states are doing and will probably continue to do all in their power to eliminate serious overproduction and thus avoid strict federal guardianship, otherwise inevitable in the coming session of Congress. Texas will have an opportunity to demonstrate her ability to justify the claim to the state's exclusive right to control her own industry.

U. S. production, runs to stills and price of crude oil in relation to stocks of all petroleum products.



U. S. consumption and exports, production, imports and prices of motor fuel in relation to motor fuel stocks.



An interesting phase of the general NRA impasse between the NRA administration and Clarence Darrow's National Recovery Review Board was the fact that the only code to escape vigorous criticism in the Board's second report submitted to President Roosevelt on June 9 was the code for petroleum industry, the Board complimenting Harold L. Ickes, Secretary of the Interior, for his able administration.

Federal Taxation

THE FEDERAL revenue act of 1934 effective June 9 imposed two additional taxes upon the oil industry: 1/10th of 1 percent a barrel upon crude oil production and a tax of the same amount upon crude oil refining (processing). While the total amount of taxes to be collected is minimum, reaching but around $1,800,000 per year, the real purpose of imposition was to secure hold upon the producers and refiners of "hot" oil, since it was found that in the United States the federal government can reach law violators within the separate states much more easily and quickly through violations of the federal revenue acts.

Cartel Agreements

ON JUNE 14 Secretary Ickes approved the Pacific Coast Petroleum Agency cartel agreement after securing consent of Attorney General Cummings. Accordingly the Department of Justice is expected to modify the San Francisco case decision which so far stood in the way of the legality of the Petroleum Agency agreement. A three-man committee will be selected by Secretary Ickes to watch the operation of the Agency, receive reports and hear complaints. Signatories of the agreement are required to abide by the Petroleum Code and not to take part in monopolies and unfair practices. Attorney General stated that with newly imposed safeguards the cartel agreement "may be beneficial in assisting in the curtailment program, in the payment of higher wages and in the prevention of the destruction of small enterprises which are, under present conditions, unable to stand the pressure of cut-throat competition."

On June 23 definite approval of the cartel which is composed of three principal features was announced: 1. Members of the cartel agree not to purchase, transport or run to stills any oil produced in excess of federal oil administration's allowable; 2. To post gasoline prices and sell only at the posted price whether sold directly under the company's brand or indirectly under another brand; 3. Companies which have signed the agreement will purchase from independent refiners all gasoline which cannot be sold by the independent refiners in the regular course of their business, relieving the market of surplus and distress supplies.

The cartel plan sets up the Pacific Coast Petroleum Agency composed of 13 of the larger companies, including Standard Oil Company of California, Shell Union, Union Oil, The Texas Company, General Petroleum, Rio Grande Oil, Gilmore Oil, Seaside Oil, Richfield Oil, Guardian Oil, Signal Oil and Rocket Oil companies. The management is to be vested in a board of governors, on which each member company will be represented. Obligations of members to participate in purchases of oil and gasoline are to be determined on a pro-rata basis established by volume of business done. The Agency is scheduled to terminate on June 15, 1935, or on discontinuation of the National Industrial Recovery Act.

The Planning and Coordination Committee is currently formulating and will attempt to organize a cartel agency, similar to the one planned on the Pacific Coast, in the East Texas field.

Texas Production Control

SECRETARY ICKES stated on May 23 that the decision of the Fifth Circuit Court of Appeals in New Orleans upholding the constitutionality of the Petroleum Code, as reported in the preceding issue of WORLD PETROLEUM, was "an event of the foremost importance . . . the preceding decision of the Federal District Court of Texas, which denied the constitutionality of the Code, left it virtually unenforceable. . . ."

Immediately after the Court's ruling L. R. Glavis, chief of the division of investigation for the Petroleum Code, announced that the federal government will launch a vigorous campaign against producers and refiners of "hot oil" in East Texas field. The federal enforcement personnel in the East Texas district was increased to around 100 operatives in June. The effectiveness of the federal enforcement in the East Texas field will depend upon the measure of cooperation between state and federal officers. To date full cooperation has not been observed due to the recently pending, but now defeated, Federal Oil Control Bill which would have greatly curtailed the rights of the Texas Railroad Commission. In fact, the allowable for the State of Texas, as ruled by the Commission in the middle of June, was around 1,070,000 bbl. per day, or about 38,000 bbl. per day in excess of the Federal June allowable for the state.

The crude oil overproduction of "hot" oil in the East Texas field continued during June at a rate above 50,000 bbl. per day, probably at times reaching 150,000 bbl. per day.

National allowable crude oil production for July was increased to 2,530,300 bbl. against 2,528,300 bbl. in June. The new allowables become effective July 1. While Texas, principal source of overproduction, had her allowable increased 9,800 bbl. daily to 1,042,100 bbl. per day, Oklahoma's daily allowable was decreased 22,200 bbl. to 489,500 bbl. Other states whose daily allowable was increased were: California, Kansas, Louisiana and Michigan, while allowables were decreased for New Mexico, Colorado, Montana and Wyoming. Allowables for other states remained the same as in June.

Labor Situation Improved

THE LABOR situation in the oil industry improved notably during June influenced in part by at least temporary postponement, or abandonment, of major strikes in the steel and automobile industries. The only strike of any consequence was reported from St. Louis where 1,000 filling station attendants walked out on June 2 demanding a pay increase, but enough men reported to work under police protection to make the strike non-effective.

A very important precedent was established by the Consolidated Oil Corporation (Harry F. Sinclair companies) on May 31 when it signed a detailed relationship agreement with the International Association of Oil Field, Gas Well and Refinery Workers. President of the American Federation of Labor, William Green, cooperated with the Consolidated Oil Corporation and the labor officers of the Association in order to reach a satisfactory agreement. President of the American Federation of Labor stated in part:—

> "The agreement is a treaty of industrial peace which I thoroughly approve. It recognizes the rights and obligations of both parties and provides machinery for the settlement of disputes in such manner as to secure justice for the workers without compelling them to resort to strikes. This agreement establishing a procedure for the settlement of controversies removes the fundamental cause of most labor conflicts.
>
> "This is the first agreement of its kind and in my opinion marks a new era in the relations between the employer and employed. H. F. Sinclair and I with H. C. Fremming, president, and R. H. Stickel of the International Association of Oil Field, Gas Well and Refinery Workers, have been in collaboration for weeks in its formulation.
>
> "Another important feature of the agreement is that it provides a sound basis for the settlement of disputes between the employer and the worker without calling on outside parties for assistance. . . . The contract is worthy of study by every employer and worker in our country."

Simultaneously with the labor agreement, the Consolidated Oil Corporation announced an upward adjustment in the wages of the hourly workers ranging from 4 to 13 cents an hour, effective June 1, and establishment of a definite vacation program for the workers. The new vacation program allows hourly workers upon completion of one year's continuous service one week's vacation with pay; upon completion of two years' service the plan allows two weeks' vacation, one week of which is to be with full pay; and after four years of service the program allows two weeks' vacation with full pay, all vacation pay based upon full time weekly earnings in the three months prior to vacation time.

Representative Examples of Hourly Rates in Consolidated's New Schedules

Roustabouts (field workers)	$0.74
Pumpers	0.80
Unskilled laborers	0.55
Carpenters	0.83
Truck Drivers	0.85
Machinists	1.04
Electricians	0.93

Regulation of Royalties

THE SECURITY Exchange Act of 1934, with its attached amendments definitely brings the fractional oil royalty interests under federal government restrictions, and will thus attempt to stop one of the most flourishing swindling operations of recent times. The royalty business, based upon the share of crude oil and gas reserved by the fee owner of the land for permitting another to develop his property has been and is a very profitable branch of the oil industry if conducted by specialists, as proved lately by the action of most major oil concerns in accumulating such interests. However,

financial promoters of questionable reputation developed the oil royalty business to an extent where the purchaser did not have any chance whatsoever to obtain a return of even a fraction of his capital. Royalty interests were subdivided to as little as one barrel out of every 150,000 bbl. produced, while the purchasers, not being acquainted with the oil business, were persuaded that interests were much larger. Similarly huge commissions up to 500 percent were added to initial cost, especially in states and countries far distant from the oil fields. The investor in producing royalties was particularly easy to sell because the salesmen stressed the oil production as an investment dividend instead of a wasting asset, and only after such dividends were discontinued after two or more months did the investors realize that their losses were around 75 percent or more.

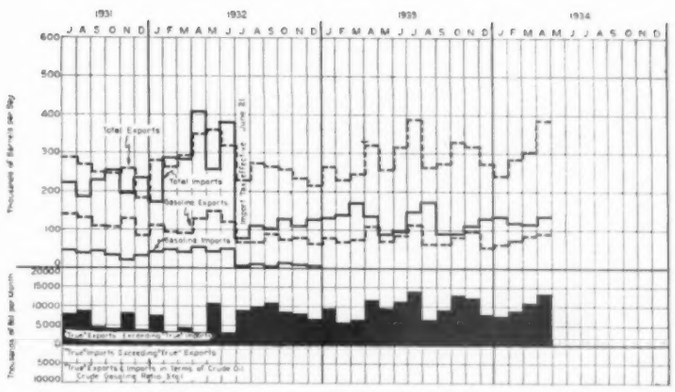
The federal government may have some difficulty in checking on the fractional royalty transactions inasmuch as principal sales falling under the new law have been to small investors in amounts of under $500, and but very few of the buyers will care to institute useless and expensive law suits against sellers well versed in evading the law. There remains, however, one excellent way to check shady royalty deals at the source by following royalty transactions in principal fields from the county records and through the records of the pipeline companies which disburse royalty receipts.

Exports Increase Sharply

DURING April, 1934, total imports of all petroleum products into the United States increased to 4,103,000 bbl., 136,800 bbl. per day, as compared with 3,603,000 bbl., 116,000 bbl. per day, imported during the preceding month. Under the federal quota the imports are limited to 108,400 bbl. per day; therefore during April, 1934, the quota was exceeded by 28,400 bbl. per day; and over the September, 1933–April, 1934, period, inclusive, the imports averaged 117,200 bbl. per day, therefore exceeding the quota by 8,800 bbl. per day and by 2,130,000 bbl. over the whole restricted period.

Exports of all petroleum products, including motor fuel, in April, 1934, again increased sharply to the near record figure of 11,617,000 bbl., 387,000 bbl. per day, as compared with 9,353,000 bbl., 310,000 bbl. per day, exported in March, 1934, and were 20.10 percent above total exports in April of 1933, thus continuing to reflect the advantages of the lower dollar exchange. Motor fuel exports during April, 1934, amounted to 2,723,000 bbl., as compared with 2,540,000 bbl. exported in March of 1934, an increase of 7.2 percent; but 16.4 percent below motor fuel exports in April of 1933. Exports of crude oil from the United States increased sharply to 3,942,000 bbl. during April, 1934, as compared with 2,582,000 bbl. exported in the preceding month; and 2,939,000 bbl. exported in April of 1933. Therefore, in April, 1934, the crude oil constituted 33.9 percent of the total exports of all petroleum products.

The United States dollar, officially stabilized on January 31, 1934, at 59.057 percent of the former value, remained unchanged during June, and definite indications appeared that the administration was swinging away from the inflationary tendencies.



Total U. S. imports and exports and gasoline imports and exports in relation to true exports exceeding true imports.

Production to Affect Prices

CRUDE OIL and natural gasoline production during May, 1934, averaged about 2,630,000 bbl. per day, unchanged from the preceding month when the average production was 2,629,000 bbl. per day and 361,000 bbl. per day in excess of crude oil and natural gasoline production during May of 1933. In May the estimated crude oil production thus exceeded the federal allowable by about 165,000 bbl. per day, and early in June the overproduction continued at a rate of about 120,000 bbl. per day even though the federal daily allowable was increased from 2,366,200 bbl. in May to 2,528,300 bbl. in June. East Texas continued as the principal source of overproduction, followed in smaller volumes by Oklahoma and California. Natural gasoline production in the United States approximates currently 100,000 bbl. per day, and is not included in the federal allowables.

It is apparent therefore that the enforcement of federal state allowables continued entirely ineffective. There is a possibility that federal and state officers may eventually close in the overproduction in the East Texas field, in which case other states will more readily fall in line, but East Texas so far could be actually controlled only by state national guard troops under martial law and it remains to be seen whether present efforts will prove to be effective. It may yet be necessary during the coming summer again to call out the soldiers to shut-in the East Texas field entirely to prevent another price debacle comparable with May–June of 1933.

Total stocks of all oils decreased by 224,000 bbl. during April, 1934, to a total of 589,795,000 bbl., indicating a daily gross decline of 7,450 bbl. The decline in stocks was made possible only because of very large export movement during April and is therefore deceptive.

The crude oil runs to stills during May and early June, 1934, continued at a very high rate, averaging around 2,500,000 bbl. per day, thus also exerting an influence towards the downward revision of prices.

Motor Fuel Demand Increased

INDICATED domestic demand for motor fuel during April, 1934, averaged 1,091,000 bbl. per day, an increase of 10.76 percent above the revised daily average during March, 1934, when 985,000 bbl. per day was consumed; and 85,000 bbl. per day above the domestic motor fuel consumption in April of 1933, an increase of 8.45 percent; 37,400 bbl. per day above the domestic motor fuel consumption in April of 1932, an increase of 3.55 percent; and 47,600 bbl. per day under the domestic motor fuel consumption in April of 1931, the peak year, a decline of 4.18 percent. The domestic motor fuel demand thus continues to show a marked improvement in consumption over the corresponding months of 1932 and 1933, even approaching in volume the 1931 peak year. The NEW YORK TIMES weekly combined business index declined slightly from the preceding month dropping to 84.6 in the week ending June 9, 1934, as compared with 88.7 in the week ending April 28, 1934. Early in June, 1933, the index stood at 87.1 just before ad-

Effect of Federal Proration Orders on Principal Oil Producing States

(in barrels)

	Sept. 1933 to May 1934 Cumulative Over-production	May 1934 Over-production	June 1934 Federal Daily Quota	Daily Average Production for Week Ending June 2	Daily Average Production for Week Ending June 9	July 1934 Federal Daily Quota
Texas	13,672,000	2,790,000	1,032,300	1,081,000	1,125,000	1,042,100
Oklahoma	4,281,000	1,100,000	511,700	477,000	549,000	489,500*
California	4,300,000	590,000	500,300	458,000	497,000	509,400
Kansas	768,000	270,000	130,300	132,000	127,000	134,500
United States	24,517,000	5,020,000	2,528,300	2,491,500	2,646,500	2,530,300

* Oklahoma's July allowable was reduced 22,200 bbl. officially "because of prevailing unbalanced conditions between supply and demand brought about by excessive accumulation of crude oil in storage," and probably in consideration of the rapidly declining potential in the Oklahoma City pool.

vancing to the 1933 peak of 99.0 in the middle of July, 1933; early in June of 1932, the index stood at 66.5; and early in June of 1931 the index stood at 87.0, suggesting currently a healthy gradual improvement in business activity, rather than the meteoric rise of 1933. Considerable improvement in business activity may be anticipated in the coming months, some fundamental changes for the better already appearing. The labor situation has been improved throughout the country, and the federal government is thought to be veering away from further radical experiments and inflation towards more conservative measures, thus giving more confidence to business.

The daily rate of exports of motor fuel averaged 91,000 bbl. in April, 1934, 11.0 percent above the exports in the preceding month; 16.5 percent under the motor fuel exports in April of 1933; 28.4 percent under the exports in April of 1932; and 34.8 percent under the exports in April of 1931.

Total daily demand for motor fuel in April, 1934, therefore was 1,182,000 bbl., an increase of 6.00 percent as compared with the total daily demand in April of 1933; 0.12 above total demand in April of 1932; but still 7.52 percent under total demand of April of 1931, the year in which motor fuel demand was at its peak.

On May 1, 1934, motor fuel stocks at refineries, plants, terminals and in transit amounted to 65,608,000 bbl., a decrease of 583,000 bbl. as compared with stocks on hand on April 1, 1934, indicating that during April motor fuel demand exceeded supply by 19,420 bbl. per day.

Prices Weak—Threatening Break

DURING late May and first half of June crude oil prices throughout the United States were maintained, but the continuous overproduction threatened a very serious break in the whole price structure even though it appeared inconceivable that East Texas producers will choose to receive 25 cents per barrel, instead of the current $1.00 posted price. With the additional U. S. currency discount 25-cent a barrel crude oil will mean but 14.78 gold cents to foreign buyers and in case of such break of prices unquestionably a large volume of crude will be moved from this country. With the increased rate of production the time when present major flush oil pools in the United States will become pools with settled production will be greatly accelerated, and in final accounting only foreign buyers of cheap American crude will profit, while producers of "hot" oil in the East Texas field will be the principal losers.

During May and June refinery gasoline quotations gradually weakened while in the East Texas district the gasoline prices broke sharply. The "price wars" in retail marketing subsided considerably, with Chicago territory recording the only "price war" of major magnitude with prices declining 4 cents per gallon by June 15. On the other hand price cutting was discontinued in St. Louis, parts of Rocky Mountains, parts of New England and in Oklahoma City with price advances of from 1 to 3 cents per gallon at service stations. The only general price readjustment was announced by the Standard Oil Companies of New Jersey and Louisiana (S.O.N.J.) on May 31 when these two companies advanced tank wagon/service station prices ½-a-cent per gallon throughout their territories, with exception of Delaware. Tank wagon/service station prices per gallon for motor fuel, regular grade and including all taxes, in representative districts in the middle of June were: 16.5/17.5 cents in metropolitan New York (18.3/17.8 cents in Newark, N. J.); 16.5/17.5 cents in Boston, Mass.; 13.5/15.5 cents in Providence, R. I.; 12.0/14.0 cents in Chicago; 17.5/19.5 cents in Ohio; 14.0/17.0 and 12.0/15.0 cents in San Francisco and Los Angeles respectively; 16.0/18.0 cents in Oklahoma; 15.0/17.0 cents in St. Louis; and 24.0/27.0 cents in Montreal, Canada, with a 2-cent differential for the premium grade.

Refinery gasoline quotations in the Mid-Continent districts declined from ¼ to 1 cent a gallon, the larger declines taking place in East Texas. Prices were maintained in a fairly satisfactory manner because the unofficial pool sponsored by the Planning and Coordination Committee, as reported in the June issue of WORLD PETROLEUM, purchased around 550,000 bbl. of distress gasoline during May, though the general situation, as anticipated, forced the pool to reduce the purchases, because smaller refiners, assured of markets, increased their production. Another difficulty came up when the major concerns could not definitely establish the legality of the source of crude oil from which motor fuel was refined and refused to make the purchases. It is anticipated that the Department of the Interior will be forced to waive the responsibility from the buyers as to the legality of the source of the crude oil, if the pooling plan is to be at all successful; in that case all responsibility would rest with the sellers, and the money would be held in escrow by banks until the source of oil could be satisfactorily proven to the federal inspectors.

Refinery gasoline was quoted on June 15 at 3⅞–4⅛ cents per gallon for 58–60 U.S.M. grade, 59.9 and below octane rating in Group 3, Oklahoma market; 60 to 64.9 octane rating, U.S.M., brought 4¼–4½ cents per gallon; and 65 and above octane rating, U.S.M., commanded 4½–4¾ cents per gallon; in East Texas district the respective grades could be bought at 3–3½: 3½–3⅝: 3⅞–4 cents per gallon. On the East Coast, at Bayonne, U.S.M. grade 60 to 64.9 octane rating was quoted slightly higher at 6¼–6½ cents per gallon (3.76 cents gold *). Gulf Coast prices for export on June 15 were unchanged at 5¼–4⅜ cents per gallon (2.53 cents gold *) for 58–60 U.S.M. grade.

Natural gasoline prices were unchanged from the preceding month and on June 15 natural gasoline was quoted at 2⅜ cents per gallon (1.40 cents gold *) for grade 26–70 in Oklahoma; at 2¼ cents per gallon (1.33 cents gold *) in North Texas, and at 2⅞ cents per gallon (1.70 cents gold *) in North Louisiana.

Kerosene prices declined somewhat during the last month and on June 15 grade 41–43 ww. was quoted at 3⅛–3½ cents a gallon in Group 3, Oklahoma market; and at 5½–5¾ cents a gallon (3.36 cents gold *) on the East Coast at Bayonne. Gulf Coast prices for export remained unchanged at 4⅛–4¼ cents per gallon (2.48 cents gold *) for 41–43 p.w. grade.

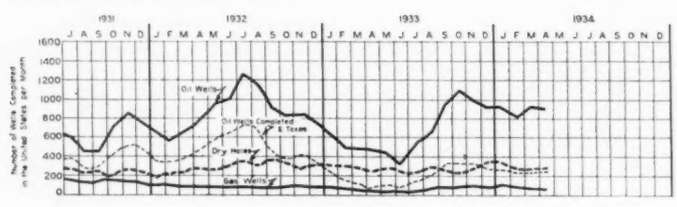
The prospects for the maintenance of present prices for petroleum products are definitely poor. The continuous large overproduction of crude oil and refined products is expected sooner or later, to break crude oil and refinery gasoline prices during the coming summer, though, paradoxically enough, it is now generally realized that with the eventual elimination of the East Texas pool from the flush class the United States may actually experience a shortage of crude oil. Current prospecting for oil in United States, conducted on a large scale by major and independent operators, has been without any discoveries even of secondary importance since the Conroe pool was discovered early in 1932.

Rusk—East Texas

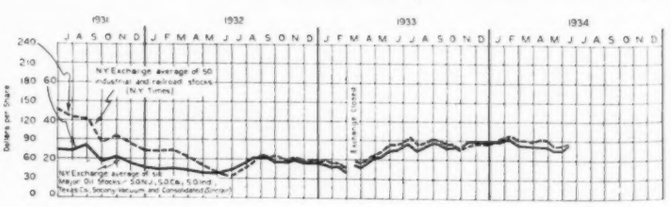
T. J. WOOD and R. M. Young No. 1 New Birmingham Development Company, in Levi Jordan Survey, in Cherokee County and 25 miles south-southwest from the south end of the East Texas field and 20 miles southeast from the Boggy Creek field found Woodbine sand from 5,111 to 5,125 ft. and when tested on June 3 and 4 flowed around 25 bbl. per hour of 40 gravity crude through ⅜-inch choke. The Woodbine sand was cored prior to testing and the cores showed some saturation. The subsequent production tests on the well, developed salt water in considerable quantity, around 25

*U. S. Dollar at 41 percent discount.

U. S. drilling; comparison of oil wells, dry holes, and gas wells.



Six major oil stocks in relation to 50 industrial stocks on the New York Stock Exchange.


1931
1932
1933
1934
J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
N.Y. Exchange average of 50 industrial and railroad stocks (N.Y. Times)
Exchange Closed

percent, with total fluid flow of around 300 bbl. per day through small choke.

While apparently opening for production a new area and appearing of great importance the new discovery is yet of questionable value. Five miles due west from T. J. Wood and R. M. Young's No. 1 New Birmingham Development Company the Cranfill and Reynolds drilled a dry hole encountering Woodbine sand at 5,146 ft., while five miles due south Mustang Oil Company also completed a failure in the Woodbine sand at 5,178 ft. It is therefore apparent that the new well, having topped Woodbine sand at 5,111 ft. does not show sufficient positive structural condition which would be conducive to the opening of a major oil field. Similarly the new discovery is considerably lower than the Woodbine sand production in the East Texas pool. Also, Woodbine sand is generally present in this section of Texas and does not lense out to the east as in the East Texas field, therefore limiting oil field possibilities to anticlinal folds, and though this section was studied extensively with seismographs no major structural features were uncovered, as substantiated by small relief of the new discovery as compared with the nearby dry holes. It may be anticipated that some production will be found in the new general area but at this time a major pool appears unlikely, while the new well has yet to prove itself even a small commercial producer.

Shell Petroleum Corporation owns most of the acreage near the new discovery, while Humble Oil and Refining Company (S.O.N.J.), The Texas Company, Sinclair-Prairie Oil and Gas Company, Sun Oil Company and Magnolia Petroleum Company (Socony-Vacuum) have been among the purchasers near the new discovery at very high prices, running as high as $1,000 per acre cash with additional $1,000 per acre out of part oil, when produced. The proximity of the Rusk area to the East Texas field and the unusually low cost of drilling will contribute towards a very rapid prospecting campaign during the coming summer months.

Cayuga—East Texas

THERE were two major developments in the Cayuga field during the past month. J. R. Meeker No. 1 Duncan, in A. Enes Survey, half a mile due east from Hill and Hill No. 1 Tubbs, a recent extensioner reported in the preceding issue of WORLD PETROLEUM, topped Woodbine sand at 4,161 ft. and drilling to 4,192 ft. found only salt water, thus defining the Cayuga field in the easterly direction.

Roeser and Pendleton, Inc. No. 1 Bowyer, in Everett Ritter survey, 1½ due west from the north end of the Cayuga pool found formations correlating 90 ft. higher structurally than in the producing wells to the east and was expected to be completed for the best producer in the field should the well developed sand body carry in that direction. No. 1 Bowyer cored some oil saturated sand from 4,037 to 4,065 ft. Roeser and Pendleton, Inc., independent operators from Fort Worth, Texas, own around 3,300 acres in a solid block for two miles west and north from this important possible extensioner and hence development of this sector of the Cayuga field will proceed slowly.

By the middle of June the Cayuga field had eight producing oil wells and 14 drilling projects, of which the discoverers of the field, Tide Water and Texas Seaboard Oil Companies, owned six and six respectively.

East Texas

THE DRILLING activity in the East Texas field continued unabated through June, with completions and locations each averaging around 85 per week, bringing the total number of producing wells in the field to about 13,750 at the close of June, or an average of 7.99 acres per well. It is apparent that the Railroad Commission is unable or unwilling to control the drilling in the field for reasons of reducing employment and perhaps with a hope that more drilling and more production will take this troublesome field off its hands quicker by natural exhaustion. The recent order of the Commission permitting drilling of equidistant offsets, which in fact was equivalent to open drilling on smaller leases and which caused filing of hundreds of applications, was rescinded by the Commission.

The bottom hole pressure in the East Texas field which was well maintained while the field was producing around 450,000 bbl. per day, began to drop sharply in the recent weeks with production mounting to around 600,000 bbl. per day, and possibly more in untraceable "hot" oil.

Small Oklahoma Pools

THE SOUTH BURBANK pool in Osage County, continued to be the most active drilling spot in Oklahoma. On the north end of the new pool the Carter Oil Company (S.O.N.J.) extended the field half a mile east with its No. 5 Ducotey southeast quarter of section 3-T25N-R6E, this important extensioner flowing 3,120 bbl. of oil with 3,000,000 cu. ft. of gas initially in 24 hours from Bartlesville sand at 2,808 to 2,867 ft. and possibly indicating considerable extension of the prolific axis of the field in the northeasterly direction into T26N-R6E. Three inside locations were completed in South Burbank during the past month for around 1,500 bbl. per day each. The south end of the field was defined by two dry holes in sections 15 and 16 T25N-R6E, Champlin Refining Company's No. 2 in southeast quarter of section 15 and Skelly Oil Company's No. 1 in southeast quarter of section 16, both wells encountering salt water in Bartlesville sand.

The Crescent field in T17N-R4W, in Logan County, Central Oklahoma, was extended quarter of a mile north by Carter Oil (S.O. N.J.) and Gypsy Oil (Gulf) Companies' No. 2 Herron in section 28 which was completed for 8,700 bbl. of oil and 9,000,000 cu. ft. of gas per day from first Simpson sand at 6,288 to 6,313 ft.

Around the Lucien field two wildcats were showing some promise and were due to test Simpson sands of Ordovician within few days. The Texas Company's No. 1 Voss, about nine miles due north from Lucien field, located on a seismograph surveyed structure, after drilling through a thin Mississippi section, had Viola limestone at 4,742 ft. and Simpson dolomite at 4,769 ft., correlating in a satisfactory manner for production, but reported to have dolomite tasting salty, which, however, does not as yet condemn the well entirely. Continental Oil Company's No. 1 Bennett in section 19—T20N-R1W, four miles due east from Lucien field, reported some oil saturation in Simpson sand cores at 5,110 ft. Both wells are relatively unimportant, because even if they open new fields, such pools will be very small, both areas being already defined on all sides by old dry holes.

The Binger wildcat test of Denver Producing and Refining Company in section 34-T10N-R10W in Caddo County which was first tested in February of current year in a lower Pennsylvania sand at 9,917 to 9,987 ft., producing from 100 to 200 bbl. of crude oil per day, is being deepened, and is now drilling at 10,800 ft., averaging 50 ft. of hole per day.

Also in Western Oklahoma the Carter Oil Company (S.O.N.J.) is starting a very important deep test in the old shallow Carter-Knox field where production is found from 1,500 to 2,600 ft. The new well No. 1 Harrison, located in section 28-T3N-R5W, is scheduled to drill to 10,000 ft. if necessary.

In Greater Seminole some excitement was caused early in June by two new producers which at first appeared as large wells but later either declined sharply or went to salt water. Both wells were located in heavily drilled sectors, but still had some space for small fields of around 200 to 600 acres. Winona Oil Company and Jarvis-Holmes No. 1 Myers in section 31-T7N-R8E drilled Simpson dolomite and sand from 4,187 to 4,216 ft. and after showing initially for 500 bbl. of crude oil per hour, went immediately to salt water producing on last available gage 1,780 bbl. of oil and 2,502 bbl. of salt water on 1¼-inch choke in 24 hours. Fleetborn Oil Company, Amerada Petroleum Corporation and Stanolind Oil and Gas Company (S.O.Ind.) No. 1 Bowlegs in section 27-T8N-R8E, located on seismograph surveyed structure, was completed for 950 bbl. of 39 gravity crude oil per day from Simpson sand at 4,197 to 4,214 ft.

New Pools

FOUR NEW pools were discovered in Western Kansas during the past month, all probably of secondary importance.

Continental Oil Company's No. 1 Graber in section 32-T21S-R1W, in McPherson County, found Huton limestone from 3,274 to 3,293 ft. and was completed for 300 bbl. of 42 gravity oil per day. No. 1 Graver is 7 miles due south from the Ritz-Canton-Galva field.

T. Palmer, Inc. and Dickey Oil Company's No. 1 Nordling in section 19-T18S-R2W, also in McPherson County, had Viola limestone at 3,190 to 3,199 ft., and after acidizing was completed for around 300 bbl. per day. T. Palmer's discovery is but three miles due north from the old McPherson gas field.

Continental Oil Company, Empire Oil and Refining Company and Shell Petroleum Corporation's No. 1 Lansing-Bennett in section 25-T18S-R8W, in Rice County, extended Arbuckle "Siliceous" limestone producing area 8 miles due eastward from the Barton Arch Arbuckle limestone older fields, when it encountered saturated limestone from 3,132 to 3,156 ft. swabbing around 500 bbl. per day, but refusing to flow naturally.

BASIL B. ZAVOICO

Union Soviet Socialist Republics

Official Figures for Soviet Oil Operations

1934	Crude Production (bbl.)	Daily Average (bbl.)	Run to Stills (bbl.)	Drilling (feet)
January	13,356,000	430,840	11,680,900	317,011
February	12,488,000	446,000	10,621,800	321,509
March	14,644,000	472,400	12,257,000	360,096
April	14,081,000	469,397	12,637,100	353,311
May	14,315,000	461,774	13,101,900	384,793
Total 5 Mos. 1934	68,884,000	456,185	60,298,700	1,736,720
Total 5 Mos. 1933	57,092,700	378,097	51,989,700	997,950
Total 1933	149,901,900	407,950	131,591,300	2,789,523
Quota 1933	170,800,000	467,670	135,000,000	3,315,000
Quota 1934	214,900,000	588,876	161,000,000	4,950,000

Crude conversion: One ton=Seven bbl.

176,000,000 Bbl. for 1934

ONCE AGAIN the Soviet oil industry is facing difficulties and is hampered in its progress. Today the Soviets look upon oil as the black treasure which supports the industrialization of the country and mechanization of agriculture. After three years of favorable development during the First Five Year Plan the Soviet oil industry has met with difficulties which have been increasing gradually in proportion with the increased demands for oil. Crude production of 1933 of 149,901,000 bbl. (170,000,000 bbl. planned) against 149,744,000 bbl. produced in 1932 shows an increase of only a fraction of one percent, while the decrease against 156,000,000 bbl. produced in 1931 amounted to four percent and the fact that the total output of all oil fields in 1933 has kept pace with production during the preceding year was largely and perhaps exclusively due to the gushers of Lokbatan and Kala of Baku. The total crude produced of all Baku fields during 1933 increased from 85,400,000 bbl. in 1932 to 108,700,000 bbl. in 1933 which is an increase of over 24 percent, while all other Soviet oil fields have shown decreases.

Grozni oil fields production decreased 36.5 percent; Maikop, 34.4; Emba oil fields, 21.3 and all other fields decreased by 21.2 percent.

In spite of the fact that the oil industry as a whole could not live up to the planned quota of production of 170,800,000 bbl. of crude in 1933, due to technical deficiencies and lack of equipment and supplies, the plan for 1934 was still further increased to 214,000,000 bbl. of which the Baku oil fields were to supply almost 70 percent, instead of 55 percent as in previous years. Actual crude production during the first five months of 1934 furnish cause for grave anxiety that the plan for 1934 will not be achieved.

Estimated Crude Production for 1934—Daily Average in Barrels

	Planned—January through December	Estimated—June through December	Actual—January through May
Azneft	410,000	360,000	342,000
Grozni	96,000	75,000	68,000
All others	95,000	75,000	68,000

Hence, it may be estimated that the U. S. S. R. will produce during 1934 approximately 176,000,000 bbl. against a quota of 214,900,000 bbl. Crude production during the period Jan.–May, 1934 has amounted to 70,000,000 bbl. as against 56,000,000 bbl. produced during the corresponding period of last year. The increase against last year is about 24 percent and the arrears against the plan are about 40 percent.

Statistics for the first four months of 1934 show plan fulfillment of the quota set for the entire year 1934 for the oil industry of 27.5 percent against 31.4 percent for the coal industry, 31.8 percent for tractor manufacture and 31.0 percent for iron ore production. Drilling operations show 26.9 percent of plan fulfillment for the year during the period, which, although below expectation, is an increase of 69 percent against last year.

During the first four months of 1934 a quantity of 47,600,000 bbl. of crude was run to stills at all Soviet refineries (18 percent increase over last year) and has yielded 7,506,000 bbl. of gasoline and ligroin; 10,800,000 bbl. of kerosene and 1,400,000 bbl. of lubricating oils.

Operations at Baku

THE OIL FIELDS of Baku are producing on the average about 350,000 bbl. of crude per day against 170,000 bbl. per day produced on an average during 1930. The total crude produced at Baku during the first five months of 1934 exceeded the corresponding figure for the same period of last year by approximately 45 percent and drilling at all fields of Baku has exceeded last year's figures by 67 percent.

Plan Fulfilment at Baku

	Production (Barrels)	Plan (percent)	Drilling (feet)	Plan (percent)
January	10,430,000	83	207,000	100
February	10,390,000	84	188,000	81
March	11,340,000	90	217,000	80
April	10,969,000	87	214,000	81
May	10,500,000	85	216,000	80

Breakdowns at wells owing to lack of adequate supervision are still causing high losses and waste of time in the fields and owing to lack of tools and supplies or perhaps because of lack of adequate technical supervision hundreds of wells are in dire need of repairs or of cleaning which are being overlooked and neglected.

Of 5,000 operating wells at Baku over 1,000 wells were idle on March 1 owing to some defect, and these figures do not include wells which were under repairs at that time.

Two serious breakdowns have recently happened at wells of the Lokbatan field which the Regional Communist Party has investigated and found that the breakdowns were caused by negligence of the drilling supervisors, which is tantamount to criminal sabotage. In both cases the drilling supervisers' connection with the communist party was terminated and they await action by the district attorney which will probably result in the imposition of heavy penalties.

Grozni

CRUDE production at Grozni is still behind the plan and the October field has decreased production about 7,000 bbl. per day as a result of insufficient technical supervision of all gaslift wells and inefficient operation of pumps. In addition to this all other wells have failed to meet requirements. For example the efficiency factor of pumped production does not exceed 0.4 percent as against a possible efficiency factor of at least 0.6 percent if all repairs were completed.

In the October fields as in many other oil fields drilling operations are being counted by distance and not by quality and this affects the output of crude because of insufficient numbers of wells brought under operation, the tendency being to drill in shallow pools for footage records rather than for flush production.

Lack of tools and equipment for repair of old wells, all equipment, tools and supplies being directed to new drilling, will result in decreased future production. There are hundreds of wells in need of repairs. These wells would have increased the daily average of crude production by hundreds of tons if they were not neglected. Some of these wells have been idle for over twelve months owing to lack of swabbing. In March the geological survey

of Grozni indicated 86 wells which needed repairs which would have increased the daily average of crude production by at least 8,500 bbl. of crude per day. However, no action was taken and the number of idle wells is increasing.

Drilling statistics from Grozni indicate that 25 percent of the available working time is wasted on avoidable delays, 8.7 percent on unavoidable delays, 21 percent is spent in useful drilling, 17 percent in cleaning, 12.6 percent in hoisting tools, and 15.7 percent on all other time losses.

Extensions

ACAD. I. GUBKIN has asserted that all planned exploration drilling at Baku during 1934 may prove insufficient to prepare the necessary territories upon which the crude production plans of 1935 and 1936 are dependent. Already exploration drilling is some 145,000 ft. short of the required amount and the geologists of Baku have suggested allotting an additional 600,000 ft. of drilling in 1934 in order to define proven oil areas. It has been found that the Balakhani field (Lenin group) and Surakhani field (Ordzonikidze group) have extended operations beyond the limits of proven lands and this was done without necessary authorization during the past year. The practice has shown, however, that drilling conducted without previous authorization is likely to result in the disadvantage of a high ratio of breakdowns at wells and very uncertain production.

The geologists have suggested immediate steps to increase drilling. Azneft Development Trust has been drilling successfully during the first quarter of 1934 and has exceeded the plan by at least 4,000 ft. The operations of this trust which has recently been created for development of new oil lands in the vicinity of the Apsheron peninsula have been concentrated on the Kudakhiani field which is showing considerable promise. All drilling in this field has been done with high quality equipment fitted with the most modern devices including drilling controls in order to avoid crooked holes, etc. At present five new wells are under operation and it is expected that early in 1935 this field will be included as producing property of the Lenin group of fields.

Another potential producing property is the district of Mardakhani. Three gas wells are under operation at present and the oil sands are reported to show commercial saturation. The geological structure of this district is identical with the fields along the shore line of the Caspian sea and production is expected by the end of 1934.

The Zikha district is under successful exploration. Eleven wells were drilled to date; wells no. 5 and 11 are promising producers. At a depth of 3,800 ft. gray clay sands were discovered showing commercial saturation and the wells are under test.

The field of Shongar situated in the north western direction of Ker Gez under exploration at present, is enclosed between two mud volcanoes and promises commercial production in the near future. Three wells were drilled in this region where the geological structure appears similar to that of the producing fields Puta and Ker Gez, but drilling is slow and difficult. It is thought that lower formations may prove to be of the same nature as at Lokbatan.

Outside of the Apsheron peninsula the districts of Aliati and Kabristan were discovered and explored. Aliati represents an area 150 kilometers from Baku encircled by the Transcaspian railroad and the Caspian sea. The valley is surrounded by hills and several places may prove as prolific as Pirsagat, Biandovan and Khirdiliansk where 10, 4 and 2 wells respectively were drilled up to date. Some of these wells have yielded oil from depths of 1,500 ft. and together with the flow of gas about 2,000 bbl. of oil were produced containing about 11 percent of gasoline.

All these new extensions are bound to transform the geographical situation of the oil fields of Baku which is being extended to the southeast of the Caucasus in the direction of Shemakha. A conservative Soviet estimate of the resources has placed the oil available in these new fields at about 1,500,000,000 tons of crude.

Eastern Fields

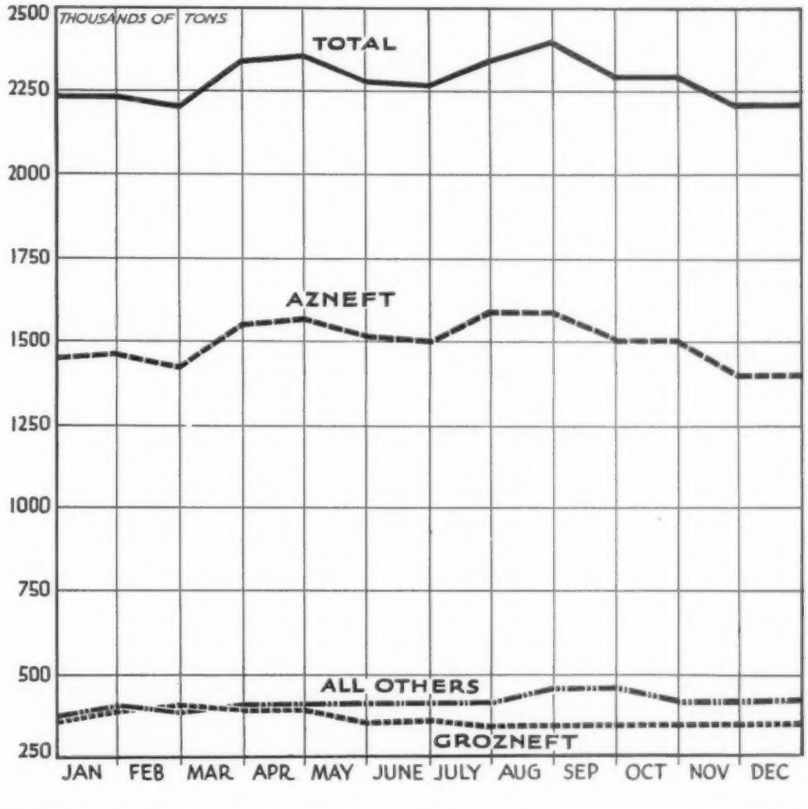
OVER 71,000,000 Rbl. were spent in the Eastern regions for development of new oil fields since the discovery of Chussoff villages in 1928 and over 57,000,000 Rbl. will be spent for the same purpose during 1934. However, so far the outlay has not shown any appreciable returns and operations are being extended to the southern and western slopes of the Ural mountains.

The Ishimbayevo region has been completely contoured and it is expected that not less than 3,500,000 bbl. of crude will be produced in this field in 1935 which will increase gradually in subsequent years. This, of course, depends largely upon the rate of development as well as upon the immediate building of transportation and other facilities and upon the drilling of an adequate number of wells. Vostokneft oil trust under whose authority this field has been placed reported that it is fully prepared to handle Ishimbayevo and is also prepared to extend its operations from Ishimbayevo to the northern borders of Emba up to the lowlands of Aktiubinsk-Orenburg.

The actual results achieved by Vostokneft at the beginning of 1934 covered 16 wells of which 12 were tested and brought under operation. Three of these wells are at Chussoff and nine at Ishimbayevo. During 1934 over 20,000 ft. of drilling is planned at Kusiapkolovo, Allogatovo, Tchankoi and at several places on Lake Baikal. Nineteen new structures are to be explored and a total of 126 wells are planned before the end of 1935. Along the territory from Ishimbayevo to Ufa 160,000 feet of drilling is planned for 1934 and is expected to turn this section into a new center of crude production.

Chussoff village, although a field of no

Actual crude oil production for the Soviet Union, Azneft, Grozneft and all other trusts for the first four months of 1934; estimated trend of production for the last eight months of 1934.



commercial importance, will be extended to Sterlitamak and over 20 wells will be sunk in new locations in 1935.

Levshino, a recent discovery, is about 60 kilometers from Chussoff village and has been included in the plans for drilling during 1934.

Samarski Luka, 6 kilometers from Sizran near Stavropol and Perm, is the site of a well drilled in 1931 which has since been contoured and tested and five structures found to be of an oil bearing nature. At least 50,000 ft. of drilling will be undertaken in 1935.

Sokski region will be contoured out to be included in the Sterlitamak group of fields. Plans for this region call for 15,000 ft. of drilling in three structures.

Soviet Oil Exports by Individual Products for First Quarter 1934 and 1933

(Tons)

	1934	1933
Crude oil	54,616	30,478
Gasoline	268,988	385,976
Kerosene	126,005	199,390
Gasoil	145,254	155,892
Lube oils	61,872	46,634
Diesel and Fuel oils	348,328	394,060
Other products	17,414	3,039
Total	1,022,477	1,215,469

Soviet Oil Exports by Countries of Destination First Quarter 1934 and Average Quarter 1933

(Tons)

	1934	1933
Italy	192,829	249,671
France	169,035	179,808
England	128,692	122,206
Germany	127,282	126,375
Spain	103,915	85,540
Japan	216	91,610
Belgium	42,286	64,913
Sweden	40,386	54,654
Turkey	4,089	14,025
Holland	3,580	15,283
Denmark	27,377	30,633
China	11,334	26,688
South America	14,696	.....
Persia	10,094	8,221
Finland	4,327	5,057
All others	143,021	148,929
Total	1,022,477	1,223,613

Orenburg-Aktiubinsk is the central region which will unify the oil fields between the Caspian sea and Uktha. Vostokneft has decided to start drilling along the borders of Emba in the Eastern districts. Geophysical and geological surveys will be followed by 23,000 ft. of drilling in four structures.

Positive results in drilling at several places on Lake Baikal have induced Vostokneft to start drilling 15 wells, a total of 45,000 ft.

Such are the plans for 1934 and 1935 in order to comply with the suggestion of J. Stalin to create an independent oil center in the Eastern regions of U.S.S.R. Over 60 geological expeditions were sent out to explore and to prepare the fields for commercial production. Over 20,000 ft. of drilling was undertaken in these regions during the first quarter of 1934. The plan for the quarter was set at 35,000 ft. of drilling, but in face of all difficulties encountered and lack of equipment, supplies and labor, the results achieved so far are to be considered as a success. There is no doubt that the Eastern regions of Russia will prove of great value as oil fields, but it may take some time before the Baku and Grozni oil fields will cease to be the mainstay of Soviet oil production.

Completions

KHABAROVSK: 4 new oil tankers were completed for a total carrying capacity of about 100,000 bbl. of crude for service by Sakhalin oil trust and are scheduled shortly to make their first trips from Tartar bay to Khabarovsk.

At Baku telephone connections were installed in the oil field groups of Baku (Lenin, Ordzonikidze and Molotoff) in order to strengthen the technical supervision over all field operations.

A new terminal on the Caspian Sea has been erected for a capacity of 10,500,000 bbl. which will be put at the disposal of the new fields of Baku. The first shipment of oil from this terminal was made several days ago. The terminal is equipped with the most modern devices which have made possible loading of the barge PEASANT carrying 35,000 bbl. of crude in less than two hours. The terminal will be increased gradually to a total capacity of over 100,000,000 bbl. per annum.

M. Kapelushnikoff (the inventor of the turbine drill and known for his vapor-liquid phase cracking method) has been appointed Director of the Scientific Research Institute for Petroleum of Baku.

Mr. A. Bogdanoff has been appointed director of the Gorki Oil Refinery Combine which has been formed for the building of a large refinery unit at Gorki.

LOKBATAN: Well No. 97 under exploration drilling is producing from a depth of 2,225 ft., flowing 70,000 bbl. of crude per day initially.

U. S. S. R. Requirements for Consumption and Export in 1937

Product	1933 Quantity in 1000 tons	1933 Ratio in percent to total	1937 Quantity in 1000 tons	1937 Ratio in percent to total
Gasoline	2,100	11.0	6,000	15.3
Ligroin	300	1.9	2,100	5.3
Kerosene	4,600	20.1	9,500	22.7
Lubeoil	1,000	5.8	2,100	5.0
Diesel oil	1,000	5.8	5,500	13.4
Fuel oil	9,100	47.4	11,000	28.0
Asphalt	100	0.5	1,000	2.4
All other	1,600	8.4	3,100	8.1
Total	19,800*	100.0	40,200	100.0

*Actual domestic consumption 13,000 tons; exports 4,200 tons; balance in storage.

J. WEGRIN

CANADA

Imports

THE GENERAL betterment in conditions is reflected in the Canadian imports of crude petroleum, which reach a total for the twelve month period ending April 30, 1934, of 28,875,033 bbl. compared with 23,442,622 bbl. for the same period ending April 1933. Imports during April 1934 were 1,113,813 bbl. compared with 2,098,396 bbl. in March, and 1,033,926 bbl. in April 1933. Imports during April originated from the United States (1,025,850 bbl.) and Peru (87,963 bbl.).

Gasoline imports continued to show their downward trend being only 17,870 bbl. in April of this year, compared with 24,568 bbl. in March, 1934, and 51,558 bbl. gallons in April 1934. Total importations of gasoline for the twelve months ending April 1934 were 369,401 bbl. compared with 1,800,304 bbl. in the same period 1933.

It is interesting to note that imports of natural casing-head compression or absorption gasoline for the twelve month period ending April 1934 have risen to 1,161,435 bbl. from 797,070 bbl. during the same period ending April 1933.

Gasoline Survey

THE DOMINION Fuel Testing Laboratories have been conducting tests on gasoline sold in Canada for some time. Tests have been run from samples collected in various parts of the country from distributing stations. The tests have been run on two batches of samples. One batch consisted of 125 samples collected from 16 cities in Canada, and the other of 134 samples collected from 17 cities. The results of these tests show that the average gasoline sold in Canada is of good quality. A marked tendency to market artificially colored gasoline has been noted over the past few years.

R. C. ROWE

Gulf Export Prices for Major Oil Products

Product		Cents per Gallon			
		May 26	June 5	June 15	June 25
Gasoline:	U. S. Motor	4¼– 4½	4⅜	4¼	4¼
	64 /66–375 E. P.	4¾– 5	4¾	4¾	4¾
	59 Oct. & below	5 – 5⅛	5 – 5⅛	5	4⅞– 5
	65 Oct. & above	5⅜– 5½	5⅜	5¼	5⅜–5½
Aviation Gasoline:	73 Oct. & above	10½	10½	10½	10½
Kerosene:	44 w.w.	4⅜	4⅜	4⅜	4⅜
	41–43 w.w.	4¼	4¼	4¼	4¼
	41–43 p.w.	4⅛	4⅛	4⅛	4⅛
Gasoil:	26–30 transluse.	3½– 3½	3⅜	3⅜	3⅜
	30 plus transluse.	3½– 3¾	3½	3½	3½
Fuel Oil:	Bunker purposes (per bbl.)	$1.15	$1.15	$1.15	$1.15
Grade C:	Cargo lots (per bbl.)	$1.05	$1.05	$1.00	$1.00
	Diesel oil (per bbl.)	$1.80	$1.80	$1.80	$1.80
Lubricating Oil: (New York Export Market)	Bright Stock No. 8	36½	36½	35	—
	Bright Stock No. 6½	35½	35½	34	—
	Warren E.	28½	28½	27½	—
	600 Unfilt.	26 –26½	26	25	—
	650 Unfilt.	28 –28½	28	27	—
	600 Flash s.r.	29 –29½	29	28	—
	630 Flash s.r.	33½–34	33½	32½	—
	Neutral 200 No. 3	37	37	35½	—
	Neutral 150 No. 3½	29½	29½	28	—
So. Texas:	300 No. 3 pale	7 –7½	7	7	—
	500 3½ pale	7⅝– 8½	7 – 8	7⅞	—
	750 4 pale	9 – 9½	8¾	8¾	—
	1200 4 pale	9¼– 9¾	9¼	9¼	—
	500 No. 5–6 red	7⅝– 8	7¾	7⅝	—
	750 5–6 red	9 – 9½	9	9	—
	1200 5–6 red	9¼– 9¾	9¼	9¼	—

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MEXICO

Launching the Monopoly

PETROLEOS de Mexico, S. A., semi-official oil company that the Mexican government has established to function in all branches of the petroleum industry, will improve national economy by fostering industrial development and increasing the public's acquisitive power, asserts the Ministry of National Economy:

"Almost all Mexico's petroleum supply sources, oil pipelines, refineries, and oil and by-products distribution organizations are in the hands of companies controlled by foreign capital. That exercises an unfavorable influence in our national economy as it subordinates the country's industrial development to the more or less exalted prices these companies set for their products, and it considerably reduces the masses' consumption power as most of the profits of these enterprises are sent abroad.

"So as to promote the industrialization of Mexico and augment the public's acquisitive power, it is indispensable that benefits of petroleum and its by-products be assured by companies composed of Mexican stockholders, the dividends of which will be distributed in Mexico, and otherwise to make certain the use of petroleum for the betterment of national economy. Such are the principal objects of Petroleos de Mexico, S. A."

The Ministry has sent official oil authorities as lecturers to all important industrial centers to wage propaganda for Petroleos de Mexico, S. A.

Tax Relief

FEDERAL government has acted toward eliminating wholesale smuggling of American gasoline into border towns which resulted in heavy losses for the national treasury by extending duty free privileges for the product to Ciudad Juarez, Palomas, Guadalupe and Ojinaga, Chihuahua state. The government avers that these duty free rights have been successful in Lower California and Sonora state border towns.

Government has also extended exemption of American gasoline from import duty to Piedras Negras, Villa Acuña and Boquillas, other Coahuila state border towns, and has reduced by 50 percent the consumption levy on that product in Nuevo Laredo, Ciudad Guerrero, Reynosa, Ciudad Mier, Ciudad Camargo, Rico Rio and Matamoros, Tamaulipas state border communities.

Federal supreme court has held unconstitutional a Vera Cruz state oil tax on profits from lands contracted before May 1, 1917 for petroleum works and a 15 percent impost on profits and royalties heirs of these land owners receive. The Court ruled that under the Mexican constitution the federal congress has exclusive right to enact petroleum and petroleum lands taxes. The case was an injunction suit against Vera Cruz to restrain it from collecting these taxes under its law on oil lands in the Tantoyuca District.

Sixth district court, Mexico City, has granted Rafael Cortina, Mexican oil man, an injunction temporarily restraining the Ministry of National Economy from voiding contract he made with owners of a Vera Cruz state petroleum tract and cancelling his concession to drill the land. Plaintiff contended that the Ministry's action was unjustified and that he had invested heavily in acquiring rights to the land and arranging for drilling.

1934 Exports and Imports

MEXICAN EAGLE OIL CO. (Royal Dutch Shell) contributed 38.1 percent of the 1933 petroleum production of 33,904,882 bbls.; Mexican Petroleum Co., 7.8 percent; Huasteca Petroleum Co. (Standard of Indiana), 7.2 percent, and International Petroleum Co., 6.8 percent, according to Ministry of Finance's special taxations department. Mexican Eagle supplied 1,939,107 of the 3,229,764 cu. mtrs. of oil and by-products exported last year, and Huasteca 658,190, the report shows. Of these total exports, 1,139,202 cu. mtrs. went to the United States; 908,155 to Great Britain; 285,440 to Germany; 199,402 to the Bahamas; 196,721 to Brazil; 189,945 to the Argentine, with the rest going to various other countries.

Last year's exports consisted of the following quantities in cubic meters: heavy crude—1,694,829; light crude—66,951; fuel oil—613,593; gas oil—210,663; gasoline—362,058; asphalt—133,509; kerosene—93,547; and lubricants—54,614.

Gasoline production for 1933 totaled 60,713 cu. mtrs.

Gasoline imports last year totaled 6,536,654 liters, which yielded federal government 552,932.32 pesos (some $149,000, U. S.) in duties. Most of this gasoline was American, the bulk of it entering through United States border towns.

Production taxes on exported petroleum and by-products and export imposts on these shipments yielded the federal treasury 7,986,704.02 pesos (about $2,200,000) last year, of which 5,544,390.43 pesos were derived from the former source and 2,442,313.59 pesos from the latter, against 4,971,893.63 pesos and 2,463,560.85 pesos, respectively, in 1932.

Cancellation of a concession granted the Compania Industrial Minera y Petrolera by Administrative Control of National Petroleum (federal government agency) on January 31, 1930 to drill wells and otherwise obtain petroleum on 1,375,000 hectares in Nuevo Leon and Tamaulipas states, near the American border, has been ordered by national supreme court. The tribunal upheld the contention of the federal attorney general that franchise must be voided as he averred that concessionaire has failed to comply with contract. This ruling restores the lands covered by the concession to federal government.

Exploration and Exploitation

JOHN R. BUNN, geologist for an American oil enterprise, is one of several foreign and Mexican technicians seeking petroleum deposits in Nuevo Leon state, near the American border. Most of the explorations are being made in the El Zacate zone.

Huasteca Petroleum Co. is pushing work on the pipeline it is building from its pumping station in the Cerro Azul fields, Vera Cruz state, to the terminal at Mata Redonda, near Tampico. These works will cost around 3,000,000 pesos (some $840,000, U. S.). The line is expected to be finished late this summer.

Belief that commercially profitable petroleum deposits exist in the Valley of Mexico, in which is situated Mexico City and which has an altitude of some 7,500 ft., will be tested as the result of authorization that the Ministry of National Economy's petroleum department has granted for explorations in Aragon No. 1 well, on the Aragon ranch, near Villa de Guadalupe, site of the shrine of Our Lady of Guadalupe, a Mexico City suburb. This well is partially drilled. Work on it was suspended in 1927.

Three more producing wells have been brought in in Vera Cruz state. The largest of these is El Plan No. 37 of the Mexican Eagle Oil Co. (Royal Dutch Shell), in El Plan fields, Isthmus of Tehuantepec region. Oil at the rate of 6,235 bbl. daily was obtained at 3,305 ft. Others are Monte No. 3, of the Mexican Petroleum Co., with a daily output of 500 bbl. at 1,608 ft., and Gonzalez No. 12 of Mexican Sinclair, yielding 202 bbl. a day at 1,721 ft.

DOUGLAS GRAHAME

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SHIPPING

THE NEW construction market continues brisk and presents an interesting and almost unbelievable contrast to the state of affairs which existed about a year ago. Several Scandinavian tankers of tramp type have recently been ordered and European shipbuilders have been in London during the last few days actively bidding for the two tankers which the Standard Vacuum Transportation Company are to build. These are to be 15,000 tonners, orders for one of which has been placed in a German yard and the other has gone to a Dutch yard. These tankers are particularly interesting in view of the fact that they will be used in the service of a merger company in the Far East which combines the refining and distributing equipment of Standard Oil of New Jersey with the marketing facilities of Socony Vacuum. This merger of interests has already formed the subject of editorial comment and was discussed in WORLD PETROLEUM for March of this year when a map was shown indicating the region which would be served by this merger company. It would appear quite likely that further tankers must be built in the near future for this company and it is important to note that the Standard of New Jersey is following its usual custom, the practice in the past having been, in the case of the Standard companies, to use the larger size whilst the Anglo-Saxon group tend towards the smaller, and what they are pleased to term handier, craft of about 10,000 tons.

In another Dutch yard, namely the Netherland Shipbuilding Company, there are two steam tankers building for the Anglo-Saxon group for Maracaibo Lake service whilst this company has also on hand a large vessel for the Anglo-Saxon Company's recent programme of 10,000 ton tankers. Considerable interest was aroused in tanker circles in England recently by the launching of the CRIOLLO FIEL from the Haverton Hill Shipyard of the Furness Shipbuilding Company. This vessel was constructed in record time, having been launched a little over 14 weeks from the laying of the keel.

The CRIOLLO FIEL has been constructed throughout under the superintendence of Sir Joseph W. Isherwood & Company. She has been built to the order of the Standard Shipping Company for an Argentine subsidiary and will be mainly employed on the Parana River. It is interesting to note that when launched the ship was in practically a complete state except for the propelling machinery which was installed at the North Eastern Marine Engineering Company's Works at Wallsend and that the ship was finished off in about three weeks, thus constituting a marine engineering, no less than a shipbuilding, record. The CRIOLLO FIEL is a trunk deck type ship with poop and forecastle. She has an expansion trunk over the complete range of the oil compartments but no summer tanks. Built to Lloyd's 100 A.1 Class for carrying petroleum in bulk, the principal dimensions are length 362.75 ft., beam 60 ft. and depth 17.5 ft. The deadweight of about 5,350 tons is carried on a specially light draft. There are seven sets of treble tanks, the upper portion of the centre tanks forming the expansion trunk. The pump room is forward of the oil fuel bunkers at the sides of the machinery space and alongside the aftermost main cargo tank and the steam cargo pumps take their power from the two North Eastern Scotch boilers. Water ballast is carried in the fore and after peak tanks and the boiler feed tanks are in the double bottom under the machinery. The ship has two masts, a 3-ton derrick being fitted on the mainmast while the deck gear consists of 7 inch x 10 inch steam winch amidships, and a 7 inch x 12 inch special warping winch aft with a powerful steam anchor windlass forward.

It is important to recall that there is a remarkable similarity in dimensions, size and power between the CRIOLLO FIEL and the MARACAY which was built at Belfast some little while ago, originally for the Maracaibo Lake service of one of the Andrew Weir subsidiaries. This ship was later transferred to service on the River Plate where it is reported that an interesting situation recently arose regarding the charter of vessels which subsequently resulted in the ordering of the CRIOLLO FIEL, and which might have been the cause of further similar contracts being placed. At the present moment, the CRIOLLO FIEL is the only vessel of her type constructing in this country. A similar vessel is building in Denmark at the Nakskov shipyard to carry 2,150 tons deadweight on a 16 ft. 5 in. mean draft with a loaded speed of 11 knots. She has dimensions 260 ft. x 41 ft. x 18 ft. depth and is thus a somewhat smaller vessel than the CRIOLLO FIEL. It is in these smaller and unusual types, however, that a great deal of work in the future will be provided for shipyards and nowhere is this more noticeable than on the big European waterways where formerly it was customary to convert large barges of Rhine ship type into oil carriers and tow these in the usual trains of tugs. It is now becoming increasingly common to build special tankers, some of which are, if necessary, designed in such a way that they can proceed to sea on short coastwise voyages.

The Schierwater Plan is now in full working order and presumably is meeting with reasonable success although, as has been suggested above, it does not seem to be able to control the placing of contracts for tramp tanker tonnage, and the charter market during the past few weeks has not shown much sign of improvement.

A. C. HARLY